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The infantry cannot do with a gun less : the place of the artillery in the BEF, 1914-1918.

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**'The Infantry cannot do with a gun less':
the place of the artillery in the BEF, 1914-1918**

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Abstract

The First World War has been described as an artillery war. Artillery played an enormous role, but British artillerymen did not think the war should be fought around them. Rather, they believed themselves a supporting arm, supporting whoever was in contact with the enemy - most commonly the infantry.

This attitude was built up over the pre-war decade through various influences, and showed in all aspects of artillery work during the war. When bombarding before an attack, the gunners left the final decisions to others. Counter-battery fire at the German artillery grew enormously but not as a gun duel, rather so that other troops could perform their tasks with a minimum of interference. 'Creeping barrages' were developed because the infantry could not generate enough firepower themselves, and purely as a supporting tactic. Defensively, artillery spent too long blindly obeying the wishes of the infantry, and changes ultimately passed control to formation commanders rather than to an independent artillery.

Training developments changed how they performed their duties, but not towards isolation from the rest of the army. Technical competence developed as a means to tactical improvements, rather than as an end in itself. Command structures also evolved, but to allow higher commanders to use their artillery effectively, and steps towards independence were consciously avoided.

Rather than fighting a private war, artillerymen strove to be part of a combined-arms army. This largely meant them subordinating themselves to others, which they did. They also constantly improved what they could do, but as supporting troops they had to await complementary developments by others. By the end of the war senior officers understood not just artillery or infantry or tanks but how to combine them all. Thus came a revolution via evolution, unanimously accepted, rather than an argumentative new doctrine.

Contents

Glossary and Abbreviations	page ii
Chapter 1 Introduction	page 1
Chapter 2 Background to the War to 1914	page 15
Chapter 3 Preparing the Attack Part I: 1914-1916	page 38
Chapter 4 Preparing the Attack Part II: 1917-1918	page 59
Chapter 5 The 'Counter Blaster' and Counter-Battery Work	page 74
Chapter 6 Supporting the Attack: Barrages and Direct Fire	page 99
Chapter 7 Artillery in Defence	page 126
Chapter 8 Training and Schools	page 141
Chapter 9 Command and Staff Arrangements	page 161
Chapter 10 Conclusion: The Artilleryman's Place	page 182
Appendices	page 192
Bibliography	page 196

Glossary

BL: breech-loading, a term that applied to all guns of this era but was used only for guns where the shell was separate from the propellant, with loading thus being a two-step process

Dismounted Branch, Mounted Branch: the Royal Artillery was divided into two branches, the Royal Horse and Field Artillery and the Royal Garrison Artillery. The Horse and Field Artillery were horsed and rode the guns into action; the Garrison Artillery generally used horse traction but only shortly before the war did drivers become military personnel, previously civilians being hired.

Quick-firing: guns that fired fixed ammunition (shell and propellant combined) and had a recoil mechanism sufficient to return the gun to its firing position after each discharge. This permitted two things, an increase in the rate of fire to around 20 rounds per minute (8 rounds sustained) and the fitting of a gun shield. QF guns revolutionised artillery, but they had been adopted before the war, although most Territorial units only had older guns modified into QFs.

Shrapnel: an artillery shell filled with lead balls and a small bursting charge. It could be fused either for time delay or percussion (impact) and was effective only against personnel and horses. Designed to burst about 20 feet in the air, it had a zone of dispersal that could be well calculated. It was the main shell of the Royal Artillery before the war, and remained so for the field guns.

Abbreviations

AA: Artillery Adviser

ADC: aide-de-camp

BEF: British Expeditionary Force

BGRA: Brigadier-General, Royal Artillery (at Corps level)

BL: breech-loading (see Glossary)

CB: counter-battery

CBSO: Counter-Battery Staff Officer

CHA: Commander, Heavy Artillery (at Corps level)

CRA: Commander, Royal Artillery (at divisional level)

FAT: Field Artillery Training

FS Company, FSC: Flash Spotting Company
GAT: Garrison Artillery Training
GHQ: General Headquarters of the BEF
GOC: General Officer Commanding
GOCRA: General Officer Commanding, Royal Artillery (at Corps level)
HE: high explosive
KBS: Kite Balloon Squadron
MGO: Master General of the Ordnance
MGRA: Major General, Royal Artillery (Army level and higher)
psc: passed, Staff College; post-nominals for fully-trained staff officers
QF: quick-firing (see Glossary)
RAF: Royal Air Force (from All Fools Day, 1918)
RAHQ: artillery headquarters of a Division
RE: Royal Engineers
RFC: Royal Flying Corps (until All Fools Day, 1918)
SR Section, SRS: Sound Ranging Section

Introduction

Many histories of the First World War rightly call it 'an artillery war' but stop there. So far none have examined whether the artillerymen thought that. This simple phrase also glosses over the changes in the artillery's role and its place in the British army.

Warfare throughout history has depended on fire and movement. They are linked: fire makes movement possible and movement brings firepower to bear at the critical point. For millennia weapons and mobility were both muscle-powered, with little that was more powerful than bows and nothing faster than horses. Gunpowder revolutionised tactics but not strategy, since mobility still depended on horses. After gunpowder, there were evolutionary technical improvements, but for generations warfare changed little: with minimal study, Cromwell could have won battles in the 1630s. From that time the pace of technical change has increased every year, and especially every war.

The Western Front in the First World War is notorious for fire but not movement. It was fought at a moment of technical imbalance: firepower had been multiplied many times by a host of nineteenth-century discoveries but battlefield mobility had not. Troops, weapons, and supplies could all be delivered to the battlefield by the very latest technological triumphs. But once there they were as reliant on muscle-power as Roman legionnaires. Improvements, both technical and tactical, were immediately sought to help balance the equation but the technical ones would not bear full fruit until the next war. Meanwhile, there was a war to win, and generals had to make the best of the materials to hand.

In previous wars, if tactical movement had been stymied by firepower, generals had been able to manoeuvre strategically, but now the armies were so large that battle-lines ran uninterrupted across continents. Manoeuvring room had to be won through battles and so tactics rose in importance. Fire and movement were the two variables available for experimentation, although nobody approached the task scientifically. (There was a third element, morale, but most generals - in all armies - were convinced that their own troops had unwaveringly high morale and thus dismissed it as a variable.) Men could still only march at about three miles per hour nor had horses improved. Troop carrying machines only appeared on the battlefield in 1918 (lorries and train had earlier provenance) and were still deeply unsatisfactory; modest changes to how men moved themselves - small unit tactics - arrived sooner. These helped, but infantry did not dispose of the bulk of **firepower**. Infantry tactics could be revised but it would not be enough to dissolve the deadlock. Infantry firepower and mobility - the former astronomically, the latter modestly - both ~~increased~~ **increased** over the course of the war but man could not rival machine in producing ~~firepower~~ **firepower**.

Generals were left, through a process of elimination, with firepower as the one thing they could use to affect the course of battles, and artillery generated the bulk of firepower. Thus the crucial tactical role of artillery was thrust upon it, not sought. It was also unexpected because before the war virtually no professional soldiers had forecast strategy being dependent on tactics; indeed tactical problems were glossed over with the assumption that a locally insoluble problem would be solved somewhere else on the battlefield. In this novel, artillery-dominated fighting, there were two ways to solve the problem. More artillery might be the answer, or victory might lie in better application of what was available. A compromise might also lie with more and better.

To make matters more difficult, the details of the tactical problem (although not its fundamental nature) changed over the course of the war. If an attack was successful, even in part, the beaten forces looked for new methods. It might be as simple as more spade work, or might involve complete re-organisation of their defensive doctrine. So an attack in 1916 might have been good enough to beat the defences of 1915 but fail because of defensive changes in the interim.

The task of the defenders was simpler: they had only to disrupt the attacker's combination of fire and movement. An attack without enough firepower was already in trouble, but even balanced attacks could break down. Thanks to another technical gap, World War I was the only major war fought where generals lacked voice command: in earlier wars unit leaders could command in person and afterwards voice radio would link units. In this gap rigid planning, or improbable luck, had to replace on-the-spot operational decisions. Defenders had a third choice as well: rather than more firepower or stronger defences, they could disrupt the attackers' plans with some mobility of their own: a counter-attack. The attacker had three counters available to this: apply overwhelming firepower to deny the defender mobility; give the attacking infantry more firepower; or find some way of improving communications.

Historians of the First World War have often asked if it could have been fought better and won at a more acceptable price in terms of treasure but especially lives. Those that have examined the actual fighting of the war have divided matters into two broad categories. On one hand many generals fought on the Western Front seeking a breakthrough, thinking morale was the ultimate determinant of battle, and that the cavalry was the signal of victory; another school of thought intended to wear the enemy down through limited victories, using firepower to do the actual wearing, and relying on the technical arms of artillery and engineers far more.

Because the former was largely the system actually used in the war, its results are fairly clear, leaving the field open for speculation that the second system would have been better. At the time some officers, senior and junior, did - at least some of the time - lean towards a completely different way of fighting the war. Among these were James Edmonds

(later the official historian), Herbert Plumer and Henry Rawlinson, both army commanders. Yet historians who suggest the way the British army fought should have been fundamentally re-cast tend to assume the technical arms - largely everything except the infantry and cavalry - wanted to change to the second of the models suggested above. As far as the artillery was concerned this was not so. Artillery officers believed that their position was subordinate to that of the unit or formation commander and the general staff, because these men had to take all facets of operations into account, not just a narrowly artillery perspective. Artillerymen accepted their place as technicians and advisers, and wanted to be consulted to achieve the best possible plan, but once that plan was finalised - whether they liked the final version or not - they did their best to make it work. Thus, strange as it seems, some of the plans involving the most imaginative use of artillery were actually not drawn up by artillerymen.

These men were not revolutionaries. They accepted their subordinate role and most of them rejected the ideas expounded by many subsequent historians. Yet they should not be thought reactionaries. They were intelligent men who constantly strove to improve the artillery so that they could help the combat arms in more and better ways. Furthermore, by the end of the war, the incremental, evolutionary, steps they had encouraged and embraced added up to a revolution. Ironically, in some ways because there was no conscious search for a revolution, it was accepted when it occurred rather than being rejected.

It seems to surprise many that artillerymen, technically trained before a war that was increasingly technical, did not fight for a more technical (perhaps more modern) and less psychologically- (or morale-) based style of warfare. Some did urge technical solutions, approaching near-formal siege operations. But most artillery officers were fully paid-up believers in the dominant consensus of the British army, that at the end of the day, assuming a reasonable balance of technology, morale won battles. Even those who suggested more technical battles offered debating points rather than fully developed doctrine, and fell in readily enough when their ideas were over-ruled. Yet it is important to understand why artillerymen were part of the consensus. In part it was due to promotion patterns in the artillery. Promotion was slow - thirteen years to become even a captain - giving time for absorption of even the most radical officer into the common ethos. Also, there was a dominance of Horse and Field artillery officers in higher ranks, rather than Garrison artillerymen. Garrison gunners had the least contact with other arms - coast gunnery hardly implied combined arms tactics - and fewer opportunities for rapid promotion through campaign experience. While others might be criticised for knowing too little of technology, garrison artillerymen were criticised for knowing too little of tactics. There was wartime criticism especially of RHA men for not understanding gunnery but this declined as everybody gained experience. From 1917 RGA men earned more of the senior artillery posts, but there was no great change in the style of operations. It is also important

to recall that it was a more deferential age. Senior figures from all walks of life were questioned less, and officers below the rank of major were not encouraged to think independently. It took about 30 years to reach the rank of major, so independence of thought was not a high priority.

GHQ and the BEF went through most of 1917 making the incremental, evolutionary improvements that prepared the way for dramatic changes late in the year and for 1918 as well. The time had arrived when the army understood trench warfare and it should have been the time for military education to have been broadened, and some of the fundamentals so opaquely expressed in Field Service Regulations to be introduced to the wider audience. Some artillerymen saw this, saw they should build upon the technical and tactical training of past years to a broader appreciation of operations. The first steps were taken, often to educate the more senior ranks (often still Regulars) whose rank masked their rapid rise; while they had practical experience they lacked the theoretical underpinnings. Throughout 1918 tactical training was increased at the expense of technical, a trend set to continue in 1919 had the war lasted longer.

Many of these problems were specific to the Western Front. Other fronts and theatres presented different problems, in some ways as great but different in nature. In East Africa terrain and disease were greater impediments to moving guns than were defenders. Some troops still used black-powder rifles, and the artillery was not challenged to solve tactical problems as complex as those of the Western Front. Elsewhere the Turks proved themselves dogged fighters, but their technology and commanders were not as sophisticated as the Germans. In Mesopotamia or Palestine it was usually enough to add more artillery, any improvements in technique being a bonus. Thus Allenby was able to make attacks of a style outmoded on the Western Front. Fighting on the Salonika front against a mixed German-Bulgarian-Austrian force was similar, for the defenders lacked the resources to cope with a large Allied attack. Meanwhile, those British divisions sent to Italy to help against the Austrians came from the Western Front, were equipped to Western Front standards, fought with Western Front methods and reported that the Austrians were not as good as the Germans. The technical skill and military professionalism of the German Army drove the Allies to ever better methods of their own; in 1918 the Americans suffered severely by trying to fight with the methods of 1916 - or even 1915 - against Germans with the most up-to-date tactics. By the end of the war the British artillery was the best in the world, driven to this by an immense challenge.

This study will not examine all aspects of artillery development in the First World War.

Anti-aircraft artillery (AA) was almost completely a product of the war. Some preliminary, and highly theoretical, studies had been done about defending ports against dirigibles, which did not turn out to be the biggest threat. AA gunnery was useful in

helping to repel German aircraft attacks, but not decisive. Throughout the war the Germans had fewer aircraft on the Western Front than the Allies, and only two periods of technical advantage. They generally adopted the defensive attitude that the Allies tried to force upon them. By the Armistice there were under four hundred AA guns with the BEF, a number which reflects the relatively low need for them. While dramatic, the development of AA gunnery did not have the same effect upon the war as did more traditional gunnery. Furthermore, AA artillery grew more in sophistication and importance after World War I; any study during the war years would mainly be a preface to later events. Finally, AA matters had no real bearing on how the British army thought of warfare.

Trench mortars will also not be covered in detail. Organisationally some were part of the Royal Artillery, and all were used as part of a broader artillery plan. Heavy trench mortars were used as direct replacements of heavy artillery for those targets they could reach. Medium trench mortars similarly replaced medium guns, with the small exception of wire-cutting in 1916. That year they could do something no other weapons could, and they were appropriately used. Once technology moved on, medium trench mortars were used as short-range medium artillery. Light mortars were an infantry weapon in the First World War, as they remain to this day. In bombardments they took the place of some field artillery and in an advance they could be used to bolster the firepower of the infantry. This eased the problems of the artillery, but a detailed investigation of light trench mortar operations would add little to a study of artillery. Finally, some mortars were manned by the Special Brigade, Royal Engineers, and fired gas and smoke projectiles. For some time these 4" mortars were the only means the BEF had of projecting gas or smoke without relying on fickle winds to carry clouds towards the Germans. From 1916 they gradually lost this exclusivity and gas and smoke shells became better and better integrated into ordinary artillery tactics. The Special Brigade developed other weapons and tactics, drifting into another sphere of operations and away from the area of this study.

Questions of artillery and shell design and supply are also beyond the scope of this thesis. Design of guns and shells has been well covered elsewhere,¹ while the supply of munitions has drawn enormous attention. Everything from the shell shortage through the personalities of Lloyd George and Winston Churchill to the question of emancipation of the 'munitionettes' has been studied and, furthermore, these matters are beyond the scope of this study. Where gun or shell supplies, or their technical qualities, affected artillery tactics, they will naturally be examined.

Nor will this thesis go deeply into the services that supported the artillery, the Army Service Corps, Army Ordnance Department, Royal Flying Corps, Royal Engineers and others. These all played quietly crucial roles but were more frequently 'dogs that did not bark' and did the work required of them. When they did not - or could not - it was

¹ IV Hogg and LF Thurston British Artillery Weapons & Ammunition 1914-1918 (London: Ian Allen, 1972).

immediately obvious. As frequently, it was improvements by a supporting service that allowed the artillery in turn to improve. These developments will be examined but not beyond their application to the artillery. Regarding the flying services, adequate expression of their support for the artillery would require more space than available. From the first days of the war the two worked as closely as they could, given the limits of technology. By the war's end virtually all artillery work involved some measure of RAF help, aid so often purchased with valiant lives under the guns of the Red Baron.

As mentioned before, many histories of the First World War touch on the artillery's importance, but leave matters there. This is a definite gap in historical writing and only partially addressed by many authors who cover some of the material, often by accident rather than by design. The subject has been approached from two directions: one for a professional audience (whether military or historical) and the other for the general public. There has been slight overlap in unit and regimental histories, intended for those who want to know what the circumstances were rather than why they came about.

Professional authors during the war focused entirely on improving some aspect of artillery performance to help win the war. These were nearly all technical, bringing some new material, or new use of existing material, to the attention of the artillerymen. Immediately after the war there were many articles about units' experiences. These are wonderful sources, telling what actually happened regardless of the orders that were issued and often written by the unit commander. These limited their analysis, largely just recounting experience and offering material for later writers. A trickle of articles - some offering the analysis that earlier efforts anticipated - continued through the 1930s and into World War II when some of the same problems had to be solved. There was a 'third wave' of articles in the 1960s and 70s, reminding young officers of that generation that there was more to artillery history than just World War II. All these are valuable building blocks, but the authors had not the space or inclination to probe the artillery's position in relation to other arms.

Another entire genre of writing dealt with the details of weaponry, or the various systems and techniques that supported artillerymen, such as signals or sound ranging. Of necessity these have remained opaque to the general public because of the mathematics involved. Recently, the study of the First World War has undergone a renaissance with authors turning sharper scrutiny on the works of a previous generation. Jonathan Bailey, a serving artillery officer, has examined the history of field artillery in this century, necessarily covering World War I but often seeing it in light of later developments.² Bruce Gudmundsson, a former US Marine, also looked at artillery this century but intentionally

² Field Artillery and Firepower (Oxford: Military Press, 1989); The First World War and the Birth of the Modern Style of Warfare (Strategic & Combat Studies Institute, Camberley, Occasional Paper No22, 1996).

omitted the British artillery in favour of German and French.³ The only gunner to rate a modern biography for his service as a gunner - others have risen to high rank away from the guns - was the German genius, Colonel Georg Bruchmüller.⁴ Other authors have conversely focused on the British forces, including Robin Prior and Trevor Wilson,⁵ Tim Travers,⁶ Paddy Griffith,⁷ and Bill Rawling.⁸ All of these, naturally, deal with the artillery but from a different perspective than the present work. Prior and Wilson's two books cover very different material, but they treat the fighting components of the BEF almost as if there was no change. Because of the breadth of material they cover, their attention to the artillery is somewhat perfunctory; what they write is true, but it should be considerably expanded or qualified. Tim Travers has done very valuable work on the nature of the British army and its command system, and also historiographical work upon which this thesis draws. However, his understanding of the operational aspects of the war is sometimes awry, as Paul Harris has shown in regard to tanks. Carefully reading Professor Travers' comments about artillery shows he sometimes does not grasp the technical details sufficiently. Paddy Griffith consciously narrowed his source material in order to work faster; he was especially limited in working in war diaries. This has not made his writing less vivid but does limit his conclusions. Rawling examined solely the Canadian forces and so saw only a part of the whole BEF. He recognises this and makes proper allowances for it, but cannot help his selection of material, which leaves out much of importance.

Shelford Bidwell and Dominick Graham wrote the seminal Firepower: British Army Weapons and Theories of War 1904-1945,⁹ which shaped subsequent writings, setting the accepted wisdom for half a generation. Indeed, this study is heavily influenced by their views on the infantry and tanks. However, as befits former artillery officers, they are too generous in their views of the artillerymen of the Great War. Hardly a gunner appears on its pages but he was not right in struggling against the staff officers, an

³ Bruce I Gudmundsson, On Artillery (London: Praeger, 1993).

⁴ David T Zabiecki, Steel Wind: Colonel Georg Bruchmüller and the Birth of Modern Artillery (London: Praeger, 1994).

⁵ Command on the Western Front: The Military Career of Sir Henry Rawlinson 1914-18 (Oxford: Blackwell, 1992); Passchendaele: the untold story (London: Yale University Press, 1996).

⁶ The Killing Ground: The British Army, the Western Front & the Emergence of Modern Warfare, 1900-1918 (London: Routledge, 1987); How The War Was Won: Command and Technology in the British Army on the Western Front, 1917-1918 (London: Routledge, 1992).

⁷ Battle Tactics of the Western Front: The British Army's Art of Attack 1916-18 (London: Yale University Press, 1994).

⁸ Surviving Trench Warfare: Technology and the Canadian Corps, 1914-1918 (London: University of Toronto Press, 1992).

⁹ London: Allen & Unwin, 1982

argument which needs some moderating. Bidwell and Graham also take their story through the Second World War which draws some attention from the Great War and may also slightly colour their views of that war.

Artillery was also not well-served in the Official History.¹⁰ The authors of those volumes consciously avoided any potentially controversial assessment of the British army, instead offering narrative history. Details about the artillery are particularly scarce, sometimes nothing in entire volumes, with the reader being instead enjoined to imagine that all the events described were taking place under shellfire. Although available for public sale, the compiler of the Official History intended it more for the education of future officers than for the general public and so pitched it for the audience he had in mind, men who could fill details into a broad-brush canvas.

More popular general histories have treated the artillery even less well. Unit and regimental histories were, because of their very nature, pitched for (ex)artillerymen and the interested public, and did not intend great technical interpretation or necessarily deep analysis. In this regard the Royal Artillery is particularly badly off, since General Sir Martin Farndale's volume was largely based on a draft from the early 1950s and the author had insufficient time to check all the details, let alone add much analysis.¹¹ Truly popular histories, such as Martin Middlebrook's various volumes,¹² often leave out the artillery because the gunners' war does not fit the public's image of the Western Front. Immediately after the war many unit histories were published, covering divisional artilleries, brigades and even batteries.¹³ These were consciously old comrades' volumes, some including rolls of honour. Valuable for a sense of what the war was actually like, although generally written in a public-schoolboy style, and containing wonderful anecdotes, their whole purpose was reminiscence. Many histories of the Great War have chosen to focus on strategy more than operations, content in the main to blame the generals for failing to solve trench warfare. Inevitably these leave out any detailed discussion of

¹⁰ History of the Great War Based on Official Documents by Direction of the Historical Section of the Committee of Imperial Defence: Military Operations France and Belgium; in multiple volumes for each year of the war: 1914 volume 1, 1922; 1914 volume 2, 1925; 1915 volume 1, 1927; 1915 volume 2, 1928; 1916 volume 1, 1932; 1916 volume 2, 1938; 1916 appendices volume, 1938; 1917 volume 1, 1940; 1917 volume 2, 1948; 1917 volume 3, 1948; 1918 volume 1, 1935; 1918 volume 2, 1937; 1918 volume 3, 1939; 1918 volume 4, 1947; 1918 volume 5, 1947; 1918 appendices volume, 1935. all published in London by Macmillan except 1917 volumes 2 & 3 and 1918 volumes 4 & 5, all by HMSO.

¹¹ Indeed General Farndale confided to the present author that his history needed some revision. Discussion, 21 August 1997.

¹² The First Day on the Somme: 1 July 1916 (London: Penguin, 1984); The Kaiser's Battle: 21 March 1918, the first day of the German Spring Offensive (London: Penguin, 1983).

¹³ eg J Macartney-Filgate, The History of the 33rd Divisional Artillery in the War 1914-1918. (London: Vachars, 1921); Anon., 14th Heavy Battery RGA War Diary and Roll of Honour (London: Robert Scott, 1919); Anon., History of 88th Siege Battery Royal Garrison Artillery, December 1 1915 to July 5 1919. (no publisher, nd).

artillery, often any examination of the battles. Even writers as good as John Terraine, in books focusing on the Western Front, generally gloss over the artillery.¹⁴

There has been another thesis written about the Royal Artillery in the First World War, by an Australian, Jackson Hughes.¹⁵ He subtitled his thesis 'the development of British artillery tactics' but he periodically considers strategy. Hughes was based in Australia and while he examined many of the same British sources that were used for the present work, his limited time in Britain inevitably meant a narrower range of sources. He did utilise the holdings of the Australian War Memorial, but its archives are limited in comparison to those of the Public Record Office, especially in terms of war diaries. In focusing on tactical history, Dr Hughes differs from the thrust of the present work; he also did very little work on training but did include a chapter on artillery weapons, and his approach (excepting the chapter on munitions) was narrative rather than thematic, which may have led to some points being over-looked. It should also be said there are differences of interpretation, sometimes substantial, between Dr Hughes and the present writer.

There is a wide array of source material about the artillery. War diaries are essential primary sources, with a range of information available nowhere else. They show what orders were given and what the troops actually did, and often have analytical reports included. All war diaries for Corps artillery commanders were examined, allowing comparison between different commanders.¹⁶ Some divisional diaries were also examined when they touched upon higher-level questions. Compared with infantry units' diaries, artillery diaries are fuller and more continuous. This simply reflects the different conditions each experienced: the officer responsible for writing an infantry battalion's or brigade's diary was far more likely to become a casualty than his artillery opposite number. Artillery headquarters moved less often and had greater facilities to preserve papers they thought relevant. However, army and GHQ artillery commanders did not keep war diaries, and their influence has to be picked out of General Staff diaries and other official correspondence.¹⁷

More of the arguments and effects of the personalities involved can be understood from private papers. Those that have survived are highly variable, from diaries only listing events to voluminous correspondence and retained copies of official papers. The most useful private papers are those of the army commanders, senior artillerymen and Haig

¹⁴ see his Mons: Retreat to Victory (London: Batsford, 1960) or To Win A War: 1918, The Year of Victory (New York: Doubleday, 1981).

¹⁵ The Monstrous Anger of the Guns: The Development of British Artillery Tactics, 1914-1918. (University of Adelaide, PhD dissertation 1992).

¹⁶ see complete list in Bibliography

¹⁷ Army War Diaries are listed in the Bibliography, as are the WO158 Operations files relevant, although others were consulted.

himself. Rawlinson, commander of Fourth Army, left considerable semi-official and private papers; Horne and Allenby of First and Third Armies have left smaller collections that still reveal some facets of their work and thoughts. Among artillerymen, Birch left no papers himself but those of his right-hand man, SWH Rawlins, survive, as do many of the working files kept by Birch's office.¹⁸ These files survive, for no apparent reason, in the papers of John Headlam who was Birch's predecessor and who kept copies of minutes of many official meetings, allowing a valuable glimpse into the details of daily command.¹⁹ Herbert Uniacke, MGRA of Fifth Army for two years of crucial battles, also left considerable private and official papers.²⁰ Other, less senior, artillerymen have left diaries and papers which in the aggregate are useful but are often individually unrevealing except for detail and anecdote.²¹ Those commanders which were imaginative and aggressive, as revealed from their private papers, did tend to be promoted.

Haig's diaries and associated papers and correspondence has already attracted considerable historiographical analysis which need not be repeated here. Whatever alterations took place, he seems not to have altered his comments about artillery or artillerymen.

Two artillerymen wrote histories of the artillery in the War, one between the Armistice and peace and the other before the Second World War. Neither was published. Stuart Rawlins was one of Birch's staff officers from 1915 and took advantage of the files at his disposal at GHQ (and his position when they proved inadequate) to compile a dry staff history, carefully omitting names. Edgar Anstey wrote a livelier and more readable history and quoted from various private letters entrusted to him which have now disappeared; his work, which reached the state of galley proofs, served as the original basis for Sir Martin Farndale's volume on the Western Front.²²

Official training and tactical books and pamphlets provide an excellent guide to how quickly ideas were adopted and disseminated, but do not permit exact dating of ideas. An idea must have existed before being spread, but delays cannot be measured. The Imperial War Museum has the best collection of such material, not only Regulations and Training volumes but the critical collection of CDS and SS pamphlets produced during the war.

¹⁸ SWH Rawlins Papers, RAI military document 1162.

¹⁹ Sir John Headlam Papers, RAI Military Document 183. Headlam's papers also include much material from his time in command of Second Army's artillery in 1915 and - again without explanation - of Third Army in late 1918, when Headlam was employed at the War Office.

²⁰ Sir Herbert Uniacke Papers, RAI military document 1160.

²¹ eg AT Anderson Diary, RAI Military Document 1301; WStC Bland Papers, RAI military document 1126; JG Geddes, Diaries, RAI military document 1135; AH Hussey, RAI military document 1175; WBR Sandys, Diary, RAI military document 211. More interesting, not least because the author had a more active war career and put more of himself into his diary is Sir Hugh Tudor, Diary, RAI military document 1167.

²² EC Anstey Papers, RAI military document 1159.

These distributed the latest ideas across the army and show doctrinal changes as they happened. Of course, a pinch of scepticism needs to be used when reading these and orders alike. Not all units could do things the official way, or had their own 'better' solutions. Furthermore, if events had developed the way foreseen in orders, the war would have been won in 1914. Regardless of the 'friction' of events, these are a vital source for how the BEF wanted to fight the war.

Others have described two schools of thought within the BEF, one centring on a human battlefield and others re-casting matters to technology. This thesis examines the role and views of the artillery. But were the gunners alone in their views of their role within the army? There were several other technical arms whose views can be no more than sketched here, and which are worthy of fuller enquiry. Between them, the Royal Engineers, the air forces of the Royal Flying Corps and the Royal Naval Air Service (later merged into the Royal Air Force) and the Tank Corps were all technical arms. According to the sometime unspoken thesis of many historians they should all have wished to fight World War I in the more technical style.

The engineers showed some inclination to do so, with some officers suggesting the war should be conducted as if it were a large siege. One of the most notable of these, James Edmonds, later compiled the Official History and may have used this to exaggerate this viewpoint within the RE. Certainly, the RE had as many technical innovations to cope with as the artillery, in fact more since virtually every new development was first assigned to the sappers before being passed onto someone else. The role of Engineer Adviser at higher formations did evolve into Engineer-in-Chief; the senior artilleryman was never Gunner-in-Chief. Yet the authority of the E-in-C ran only to purely engineer matters and the sappers fitted themselves into larger plans.

Air forces are almost uniquely technical, relying as they do on technology to stay in the air, let alone for fighting power. Air power theory developed rapidly during the First World War and astoundingly afterwards, to the point of arguing that other forces were redundant. Yet during the war the RFC fought an aggressive campaign on morale grounds, viewing its aeroplanes as mere vehicles for the men in them, whose morale was still crucial. Although the air forces were separated into a third service in 1918, the reason was largely political, home air defence, rather than pressure from the forces in France.

It is the Tank Corps that has most attracted attention to itself as offering a different way of fighting the war. In 1918 tank visionaries were suggesting a completely different way of fighting should the war last another year, a plan bold on paper but not really capable of fulfillment with the machines of the day, and also lacking industrial capacity and military manpower to implement the plan. It is undeniable that tanks generally helped the infantry in World War I, often out of proportion to their small numbers and limited mechanical capabilities. Yet studies of tanks often over-emphasise their value during the war, in the

light of later developments. The fundamental difference between tanks and other weapons was one of age. Tanks were a brand-new weapon, with only a future; artillery was old and was comparatively well understood already. Changes in artillery weapons and techniques were slow and incremental, taking years before it was possible to adopt new tactics. In contrast, a brand-new weapon not just offered new ways of operating, it would seem to require them. The very novelty of a new weapon suggests new tactics are required, whilst changes in an established arm are less likely to attract attention simply because it is established and people believe they understand it. Anything that is new also tends to have a certain amount of self-advertisement, for it is invariably surrounded by enthusiasts who are convinced they are right yet also concerned others will ignore them.

In evaluating the question of whether the BEF should have made a change in their style of fighting, there also arises the question of whether artillery is a combat arm or a combat-support arm.²³ This is an argument still active today, as the artillery often are the only troops actually engaging the enemy - engaging with shell fire. Gunner generals explaining plans will point to a map, saying 'and now the guns are attacking the enemy here, then we attack them there, now shift our attack there'. The converse argument is that the gunners are not physically part of the attack, only their projectiles. Fire may well suppress an enemy, but shells will never capture a position, only make it easier for someone else to do so. Moreover, just as tanks may capture a feature, it is still a job for the infantry (properly supported) to hold it. To a large extent this argument is now chiefly for the honour of the regiments involved, but its antecedent argument was in many minds during World War I.

Technical developments that shape doctrine today did not exist in 1917 or 1918. Most important among these are intelligence-gathering and communications, but the lethality of weapons has increased enormously in recent years. Lacking these improvements, the artillerymen had to walk before they could run - and they were going at a fair pace by the end of the war. Of course the shoe pinched in other ways but the outline of the situation late in World War I looks similar enough to today's to encourage some to apply modern analysis to older problems.

Without going into great detail, the British artillery's idea of how to fight a European war was demolished by their poor performance against the Boers. They had gone to South Africa and tried their doctrine for a Continental war - not a colonial one - and failed. Consequently, the experience gained in the countless minor skirmishes and colonial campaigns weighed more heavily. Yet this experience distorted the value of firepower. Typically, the British were fighting an irregular opponent, if not engaged in guerrilla warfare. Driving the enemy from the field or gaining ground were not the yardstick of victory, unless they were to an extent that affected the natives' will to continue the fighting. What mattered more were the casualties inflicted. So the artillery became more devoted to

²³ An argument that also affects the other branch formerly trained at Woolwich, the Royal Engineers.

shrapnel - optimised to inflict casualties - and shied away from high explosive, which operated more on the morale of the recipients. Artillery operations became adjusted to destruction, not neutralisation, and of personnel, not material.

This distorted everyone's view of artillery, including the gunners'. Artillery firing shrapnel was simply a potentially more effective kind of infantry firepower: small bullets in direct fire. Guns had a greater range than rifles, and might be forced to engage enemy artillery, or at least distract enemy artillery fire away from one's own infantry. Viewed like that, it was an entirely appropriate question whether guns should be up with the infantry firing line: there were morale benefits involved. The infantry did not feel themselves alone, and the gunners could take pride in playing their traditional role.

At bottom, there was no debate in the army that the infantry and cavalry were the combat arms. Artillery and engineers supported them. Granted, the gunners and sappers were more combatant than Pay Corps or Ordnance Department or other branches, but they were emphatically not combat arms. When aeroplanes, gas and tanks developed, they were similarly pigeon-holed as support for the infantry and cavalry. Given the limitations of these novel weapons there was considerable merit in not relying upon them - at least until they had proven themselves - but the attitude made for slow responses to changes within the traditional arms.

It must be reiterated that the artillery was not campaigning for a change in the army; they accepted their role as part of 'fire' in the 'fire and movement' formula. Throughout the war, when contemplating the results of a battle and how to do better the next time, gunner officers reiterated the artillery's role as supporting the infantry. Some of the brightest did so explicitly, some did so implicitly, while others were not so intellectual and simply carried on doing what they had always done.

How did new - and sometimes modern - ways percolate into artillery doctrine? Did these ways differ for different elements of artillery work? If so, why? On the whole technical improvements - those that affected gunnery - were adopted as soon as they were invented, passed on from the top down. Local innovation might also produce a good idea which would be propagated as soon as it came to the attention of higher authorities. Some formations actively fostered technical innovation, providing a haven for inventors and experimenters, but this was a matter of the personality of the unit commander. Where technical innovations were central to a particular function of the artillery, there was little hesitation in adopting them; the rub came when other parties were affected. Even then perceptions differed for tactics and strategy: tactics might well be modified without high level concern and hence interference, but strategy over-ruled everything else. There was essentially a two-tier decision-making process: artillerymen were allowed freedom on purely artillery questions, but on matters affecting combined-arms teamwork the other parties generally won the day. Furthermore, strategy might intrude into tactics, seeking an

improbable breakthrough or forcing an ill-prepared attack. It was only in 1918, when an inter-Allied High Command was co-ordinating and limiting attacks, that the BEF's operational style changed to one that better suited the artillery, which had nevertheless continually helped as best it could, regardless of handicaps.

A thematic approach will be followed in analysing these questions. The first chapter will examine the role foreseen for artillery before the war, and how its equipment and tactics suited each other and the army. Whether these were correct is also examined in light of operations through the first months of the war. The next two chapters examine the part played by artillery in preparing attacks, mainly in bombardments preliminary to infantry attacks. Preliminary bombardments were the purest examples of how the British army wanted to use artillery, because the pressures of reacting to the flow of a battle was absent and questions of policy and practice could be examined with greater freedom. Of course, with political and alliance pressures, the BEF never had a free hand in strategy but in planning it is the opening moments of an attack that reveal most about how battle was viewed. The chapter on counter-battery work examines an aspect of artillery operations that developed almost from scratch during the war, and technically was almost entirely delegated to the artillery. It thus provides a view of how artillerymen felt they should work, either in concert with others, by themselves, or dominating the scene. Next infantry support is considered as a contrast. This was performed solely to benefit others and radically different tactics had to be developed during the war to aid the attacking troops. Again this offers opportunities to examine how the decisions were reached and what views were expressed by senior figures as to the proper role of each of the combat arms. Defending meant the initiative was not with the British, reversing the conditions of most of the war. How the infantry and artillery reacted to this forms the basis of the next chapter. Turning from combat, the next chapter examines the training organisation and also what was taught to the artillery during the war. This question is deliberately left until later in the dissertation because training matters were not dealt with early in the war in any systematic way, and chaotic circumstances resulted. As conditions changed rapidly, despite the popular impression of the stagnation of trench warfare, so training had to react. The key question examined was how this fitted into the army as a whole, for the opportunity existed for re-training the artillery should ideas on its role have changed. The penultimate chapter assesses the various levels of command, their functions and how they changed during the war. Because these changes also took place without enemy interference they are excellent indicators of what role the army asked of the artillery and what role the artillery wanted to play. Finally the conclusion draws the threads of the argument together and examines in isolation the role the artillery themselves chose to play during the war. It also tries to identify areas for future study.

Background to the War to 1914

The fifteen years before the outbreak of World War I saw a greater revolution in artillery than the previous century. Guns themselves changed but also their use in relation to other parts of the army. However the people behind them changed more slowly, making changes piecemeal and only as necessary. There were progressives and conservatives and even some modernising reactionaries, but while artillerymen changed their guns, they did not change their place in the army.

The British army went into the Boer War much as it had its other Imperial campaigns of the late 19th Century, but quickly discovered conditions had changed. Britain had no technological advantage over the 'natives' and her organisation was faulty. This is not the place to examine the Boer War in detail, but afterwards infantry, cavalry and artillery tactics were re-examined, especially in light of new weapons. Unfortunately these examinations took place, on the whole, separately and the three arms did not place more emphasis on working together.

The artillery organisation during the Boer War was broadly traditional with two elements. First, there was a senior artillery officer attached to each field force or column to oversee the co-ordination of the guns according to the tactical plan of the General Officer Commanding (GOC).¹ However, Kitchener specifically abolished the position of GOC, RA on the grounds that it divided responsibility in the chain of command.² Second, there was a staff, but it was located back at GHQ and concerned almost completely with administrative and technical matters.³ Guns were parcelled out to infantry, cavalry and mounted rifle forces perhaps more in order that each column might have guns than for any tactical purpose.

Artillery effectiveness in South Africa was quite limited due to tactical and technical shortfalls, and later due to the nature of the fighting. The battery was, at least theoretically, the standard unit, although when the mobile columns were formed they might have no more than a

¹ RH Scales Jr. Artillery in Small Wars: The Evolution of British Artillery Doctrine, 1860-1914. (Duke University PhD dissertation, 1976), p288. For examples of earlier organisations see BP Hughes, Open Fire: Artillery tactics from Marlborough to Wellington (Chichester: A Bird Publications, 1983), pp28, 143.

² Sir Charles Callwell and Sir John Headlam The History of the Royal Artillery from the Indian Mutiny to the Great War vII (Woolwich: Royal Artillery Institution, 1937), p133. Hereafter, Headlam, History.

³ For details see Anon. 'Record of Work Carried out by the Artillery Branch of the Head-Quarters Staff, South African War, 1899-1902', Proceedings of the Royal Artillery Institution (hereafter PRAI) 30: 7,8& 9 (1904), pp306-12. This was virtually the same as Wellington's staff arrangements in the Peninsula.

section - a pair - of guns.⁴ This was despite the intention that the brigade be the tactical unit. With artillery scattered in such small detachments, it could never concentrate enough guns or enough shells to have an influence on battle. The measured judgement of the Regimental historian was that 'Real efficiency could scarcely be hoped for until the brigade had been made a permanent unit with a proper staff, and that was not to be conceded until forced upon the War Office by the stern logic of war'.⁵ Meanwhile, brigades would be formed with batteries from three different stations, a commander from another and the adjutant joining from a fifth.⁶ Fire would also have to be organised without the benefit of signallers, who had been abolished for the Mounted Branch in 1899.⁷ The artillery was robbed of any voice in the higher councils where they might have had more success explaining what the guns could and could not do. This lack of centralisation made it easier to agree to the desires of the infantry and simply attach batteries to infantry brigades, which was in any case the traditional method. In hindsight it was clear that the Regiment came home from South Africa 'opposed to the principle of centralized control', a principle that was of increasing importance.⁸ It was not just the artillery that were opposed to centralisation. Both the regimental system and the Cardwell System caused difficulties and there was little incentive to overcome them. Colonial campaigns could easily be fought with *ad hoc* formations and there was no Continental commitment.

Technical problems also limited the effectiveness of artillery fire. The HE shell issued to the howitzers was unreliable and gave its most visible results when it had not, in fact, detonated properly. This led to great dis-satisfaction with explosive shell and the RA instead emphasised shrapnel. Here, too, there were problems, for the non-quick-firing (QF) guns used in South Africa had not been the best for shrapnel firing and the shell itself had flaws. The army thought this a great failing, and serious attention was paid to improving shrapnel. Shrapnel was superb for a specific function: killing men in the open, but very little use for anything else. It was also best suited for direct fire. The army did not stumble into shrapnel, it was a conscious choice, and other decisions followed on from choosing shrapnel over other ammunition. The artillery's role for almost a century had been firing shrapnel; when trouble

⁴ This was even more true of the RGA (who manned the heavier guns). EG Nicholls, 'The training, organisation and equipment of Companies of the Royal Garrison Artillery with medium guns, and howitzers, and their tactics in future field operations', *PRAI* 28:2&3 (1902), p98.

⁵ Sir Charles Callwell and Sir John Headlam The History of the Royal Artillery from the Indian Mutiny to the Great War vI (Woolwich: Royal Artillery Institution, 1931), pp254-5.

⁶ Headlam, History, p26.

⁷ Ibid., p46.

⁸ WHF Weber, 'The Development of Mobile Artillery 1914-1918', Journal of the Royal United Services Institute 64:453 (1919), p50. (henceforth, Weber, 'Mobile Artillery')

developed they solved their part of the problem rather than trying to delve into solving the whole army's problems.

Mobility of equipment was another great lesson from South Africa, although it would prove less critical on the Western Front. In mitigation, the 1914 BEF had to be equipped to fight anywhere in the world. Howitzers saw action in South Africa, but only in limited quantity for they were not as mobile as field guns. Even a few siege pieces were sent out, intended for use against the Pretoria forts. Most of the trouble moving the heavier ordnance was due to the poor arrangements for its transport. Nobody had thought it would be used in the field and oxen were used instead of horses. The guns themselves were not particularly immobile, but the bad handling of them made them appear so, and this was what was remembered.

Changing technology also encouraged the dispersion of guns. Thanks to the vastly greater firepower of magazine rifles with smokeless ammunition, artillery had to keep further away from infantry.⁹ Closing the range against an unshaken enemy would merely recreate the circumstances of Colenso, when guns had to be abandoned after adopting an open firing position well within rifle range. Increased infantry firepower meant infantry spread out more, especially when defending. A feeble central command, coupled with the lack of signallers, meant detaching batteries was probably the only thing to be done. Yet this reinforced the mistaken idea that the guns themselves needed to be present to provide fire support, that direct fire was artillery's purpose. However, the greatest change in the nature of artillery pieces was the coming of QF guns. These had an integral recoil mechanism that meant the gun did not have to be pushed back into position after firing; gunners could now stand behind the gun and a gun shield would protect them. There were a very few British QFs in South Africa, and they were rapidly adopted afterwards, greatly altering tactics. At one stroke artillery firepower was increased and vulnerability lessened; perhaps one 'lesson' of the war could be ignored and guns again stand against infantry.

As Callwell suggested, the Boer War had caused a shake-up of the organisation of the British army, especially of larger units. On paper, Army Corps had existed since shortly after the Franco-Prussian War, but not until 1902 did anyone try to reconcile paper and reality.¹⁰ Twice the cards were shuffled and units dealt out to Army Corps but the circle could not be squared: phantom men and guns were necessary. Paper divisions had two infantry and two artillery brigades, with Corps having an additional few howitzer batteries. There was a solid and

⁹ This was reflected in practice camp ranges doubling, to 4,000 yards, between 1899 and 1904. Headlam, *History*, p53.

¹⁰ *Ibid.*, p24.

functional system laying out the duties of the 'officer commanding the artillery of an army,' 'the OC the artillery of an army corps', the 'OC the corps artillery', and 'the OC the artillery of a division'.¹¹ This was the traditional way, and could work reasonably well with small numbers of guns and simple techniques - direct fire.¹² It was also close to the system that would, of necessity, be recreated during the Great War, but did not clearly define duties. However, as these Corps never really existed, commanders were never appointed nor were they ever allocated staff officers beyond ADCs or adjutants. The Corps artillery was also fictitious, since it was amongst the batteries that still needed to be formed.

The 1904-5 Russo-Japanese War attracted some attention, but was widely thought to have little relevance for Britain.¹³ There were lessons for gunners to learn regarding ammunition expenditure, indirect fire, centralised command and sieges. While both Russians and Japanese had found their artillery expending ammunition at unforeseen rates, the general European response was not to increase ammunition stocks, but to preach the virtue of economy. In Britain's case this fit particularly well with the strict economy forced by the Treasury. Indirect fire was another salient lesson from Manchuria, but it was deprecated even there. Japanese gunners were condemned by their own infantry for not being forward, despite their ability to mass fire from covered positions. With even the protagonists lamenting change, it was no surprise that most observers only agreed. The use of massive siege artillery was another novelty. Japanese 11" howitzers were deployed around Port Arthur and eventually cracked the fortifications. The utility of siege guns was partly hidden because this was a formal siege; it was not noticed how much the trench lines in other battles resembled a siege. The RGA re-wrote their volume on sieges, and the engineers were revising theirs in 1914. Interest was not particularly high and the two best articles in the Royal Artillery Journal about Manchuria appeared in 1914 and 1915. The war was on the other side of the world, and involved two second-rate military powers. The general feeling was there were few lessons to be learnt for a European war. In Britain the practical lessons were shortly competing against a more exciting French doctrine.

If slightly out of chronological order to consider the French influence here, it is convenient. Between 1908 and 1911 French artillery, indeed the whole French army, was adopting a more

¹¹ Field Artillery Training 1902 (Amended Edition) (1904), (London: HMSO, 1904), pp3-4.

¹² The heavy brigades were formed three years after making a debut on paper but were never given a role. Headlam, History, p69.

¹³ see PA Towle The Influence of the Russo-Japanese War on British Military and Naval Thought (University of London PhD dissertation, 1973) and articles in the Journal of the Royal Artillery. (Henceforth JRA.)

aggressive and offensive attitude. For the artillery this meant operating mainly by batteries, up with the infantry or possibly even in advance of the main firing line. Gunners were not to economise shells nor waste time aiming, but overpower the enemy infantry's morale with *rafales* of fire, sudden intense bursts of short duration. Destruction of the enemy was not the objective, but rather the neutralisation of his fire at the critical moment of the infantry assault. In French service, this was combined with the resurgence of the *elan vital*, *pantalons rouge* and the adoption of the offensive in their war plans. In Britain it meant rejecting the lessons the Boer War showed about advancing under fire. Movement became more important than firepower. In 1910 the infantry were no longer told 'the decision is obtained by fire' but 'fire superiority makes the decision possible'.¹⁴ This was part and parcel of the defeat of the 'firepower school' throughout the British Army. Artillery were to help the infantry maintain its battlefield mobility by suppressing enemy fire, operating if necessary in front of the main infantry line.¹⁵ Even before full flowering of French influence, senior officers stressed guns 'support[ing] the attacking infantry by the fire of advanced sections at close quarters'.¹⁶ It was to be dispersed, each infantry or cavalry unit having its 'complement of artillery'.¹⁷ Fitting this idea of suppressing the enemy rather than destroying some portion of them, targets at practice camps were altered from points to zones.¹⁸

So the British army was faced with a choice between two schools of thought: destruction or neutralisation of the enemy. Colonial wars had long centred around killing the enemy, because simply chasing an irregular foe off one hill or another was not an important step to winning a campaign. Yet South Africa had shown how difficult destruction was, even when the guns had fired unprecedented quantities of shells. The later battles in Natal had even shown how effective close infantry-artillery co-ordination could be. The French doctrine concentrated on neutralising the enemy fire just long enough for the infantry to assault. The Royal Artillery were adopting a more sophisticated doctrine, more suited to European warfare, although this does not figure in the debate largely conducted in the pages of the Journal of the Royal Artillery. But mission and munitions were mis-matched. Shrapnel was a killing round, not a suppressing/neutralising one. High Explosive was misunderstood, as was the entire subject of terminal ballistics: it was even asserted that HE was less effective than black powder

¹⁴ Shelford Bidwell and Dominick Graham Firepower: British Army Weapons and Theories of War 1904-1945 (London: Allen & Unwin, 1982) p27. (Henceforth, Bidwell and Graham, Firepower.)

¹⁵ Field Service Regulations 1909 (London: HMSO, 1909), p135. (Henceforth FSR1909.)

¹⁶ HA Bethell, 'Artillery in the attack and defence of positions', JRA 33:2 (1906), p61.

¹⁷ FSR1909, p134.

¹⁸ Headlam, History, p196.

because HE shells produced smaller fragments.¹⁹ It was thought HE was only useful for destroying things and had minimal effect on people. Artillery fire was judged entirely in terms of the numbers of bullet-equivalents it produced, not their effect on the enemy.

The Haldane reforms from 1907 were of far greater substance than his predecessor's paper-shuffling exercises. Haldane cut his suit to fit the fabric, disbanding feeble units and consolidating the rest into an Expeditionary Force. The bulk of Home forces would be organised into six large divisions each of three infantry brigades and four artillery brigades. There was a GHQ in command, and there was the possibility of Corps as an intermediate echelon. The Corps was not an important level of command, as divisions were complete in themselves: they had artillery and cavalry, while Corps had neither. Presumably the divisions would be independent enough for dispatch in Imperial campaigns, when the entire BEF would not be needed. There was only one real Corps command in peacetime, while there were divisions enough for three Corps. II and III Corps would have to be extemporised, and even I Corps would be fleshed out with officers recalled from other duties. Originally it had been thought GHQ would command divisions direct, so Corps had little authority.²⁰ One retrograde step was the abolition of the Corps GOCRA, presumably because there were no guns for him to command directly and anything else would infringe someone else's responsibility. The reorganisation of the army did not materially alter its tactics, for the two were generally considered separately. There was still a field-gun brigade per infantry brigade, and Haldane added more gun types, giving the division more independence as it became an all-arms force. With more artillery, new command measures were necessary since it was no longer possible for one man to control everything.

At divisional level, a CRA (Commander, Royal Artillery) was appointed, a step that had been specifically rejected in 1901 and 1904.²¹ Furthermore, he was to be a brigadier general, equal in rank of the infantry brigade commanders. But there was still no explanation of his duties, the last list dating from 1902 and the old Corps system. While the post of CRA was the logical corollary of doubling the number of guns in a division, it was not accompanied by allowing an adequate staff. Despite commanding more men than a cavalry brigade and more horses than the whole of the rest of an infantry division, a CRA had only a single staff captain (who was not even a fully trained Staff Officer) and a few orderlies.²² This establishment was

¹⁹ The misunderstanding of blast effects also played a role in the confusion over 'shell shock'.

²⁰ Bidwell and Graham, Firepower, p42.

²¹ Headlam, History, pp133, 134.

²² Ibid., p135.

gradually increased, most notably with the addition of a brigade major, but while beneficial, this did not get at the root of the problem: there was no defined role for the CRA to play in the division. He had a tiny part in training: at practice camps only one day was allotted for divisional work.²³ Divisional training was also of low importance: it was done after practice camp.²⁴ Even this limited amount was undercut by the unwillingness of some divisional commanders to give their CRA serious responsibility. When FAT finally decided a CRA's duties, he was mainly responsible for overseeing the efficient tactical training of his subordinates.²⁵

Meanwhile, the CRA's wartime role was unclear, to say the least. Between 1902 and 1912 manuals gave little guidance and the debate was mostly conducted in the Journal of the Royal Artillery. Each author freely interpreted what was intended by FAT, each with their own emphasis. The CRA was variously to be responsible for: integrating the artillery with the infantry's operations; reconnoitring artillery positions; controlling the brigade fire targets; being a 'consultative staff officer'; being at headquarters 'at almost all times'; passing intelligence to the infantry; or he kept a reserve of guns under his own command.²⁶ When the CRA's duties were finally settled - in 1914 - they exactly mirrored the artillery's position in the army: to ensure the infantry efficient artillery support and never forgetting the artillery's subordinate position. However, the amount of independence and even the amount of discretion he had was not clear, and if he had any he still might not be useful.²⁷ Nor would the CRA be necessarily useful on the battlefield, since his communications were so weak.²⁸ Because the earlier emphasis on the brigade as the tactical unit survived, some even thought a CRA ought not have

²³ FR Bingham, 'Practice Camps, 1912, and the lessons to be learned from them', JRA 39:11 (1913), p436.

²⁴ Field Artillery Training (Provisional) 1912, (London: HMSO, 1912), p19. Even brigades only worked together 18 days per year: p18.

²⁵ p9.

²⁶ See, for example WHF Weber, 'Some notes and suggestions on the control of Divisional Artillery in, or for, the battle', JRA 38:10 (1912), pp417-35 (henceforth Weber, 'Notes and suggestions') and 'A Divisional Artillery Staff in the Field', JRA 37:10 (1911), pp409-19 (henceforth 'Staff in the Field'); C Holmes Wilson, 'Artillery "Sous La Main"', United Services Magazine 41:979 (new series) (1905), pp329-32; CED Budworth, 'Artillery in Co-operation with Infantry', JRA 37:1 (1910), pp1-14 (henceforth Co-operation with Infantry).

²⁷ Field Artillery Training 1914, (London: HMSO, 1914), pp240-44. (Henceforth FAT1914.)

²⁸ Weber, 'Notes and suggestions', p428.

a battlefield role, save advising the GOC on highly technical matters.²⁹ It was also expected that infantry brigades would have considerable battlefield autonomy, and frequently the divisional artillery was divided amongst the infantry brigades, almost as brigade groups. Artillery signallers might be better employed in liaison with the infantry brigade than with the CRA.³⁰

To manage his imprecise but inevitable tasks the CRA had a tiny staff, but even worse was the lack of communications. There was a total of three signallers, three mounted orderlies and two bicyclists at his disposal.³¹ To compound the problem, brigades also had few resources of their own - the brigade commander was expected to locate himself with one of his batteries to economise on signallers.³² Indeed, brigades only had enough telephone cable to link their batteries, and had to be in touch with the infantry or the CRA some other way.³³ Batteries, on the other hand, were relatively overstaffed, a relic of their former independence.³⁴ The only source for help was the divisional signals company, but they would have their hands more than full simply connecting the infantry, divisional HQ and the service units. One captain summed the situation up:

Neither the Signalling Manual nor Field Artillery Training give any information with regard to the establishment of communications between the [CRA] and his brigade commanders. "War Establishments" names a staff, with a strength difficult to know how arrived at and not equal to the equipment allowed by Mobilisation Store Tables.³⁵

Given the near impossibility of a CRA actually commanding his guns, it is not surprising that old-fashioned decentralisation was so prevalent in practice. Indeed, although the brigade was supposed to be the standard tactical unit, some officers found their battery commanders

²⁹ HA Bethell Modern Artillery in the Field: A Description of the Artillery of the Field Army, and the principles and methods of its employment (London: Macmillan, 1911), pp224-6. (Hereafter, Bethell, Modern Artillery) The CRA was allowed to command if the unexpected happened and fighting became static.

³⁰ Ibid., p215.

³¹ Weber, 'Divisional Artillery Staff', p413.

³² HG Lloyd, 'Methods of Controlling the fire of an Artillery Brigade', JRA 32:7 (1906), pp313-4.

³³ Plate III in RE Priestley, The Signal Service in the European War of 1914 to 1918 (France), (Chatham: Royal Engineers Institution, 1921) shows just such an arrangement during the fighting on the Aisne.

³⁴ GE Bolster, '"Staffs" in the Divisional Artillery', JRA 38:11 (1912), p495.

³⁵ Ibid., p499.

stressing the two-gun section.³⁶ This was partly the result of brigades still being dispersed, for Treasury parsimony meant it took many years to actually provide adequate accommodation for brigades to be stationed together. Three years into a building programme only twenty-seven of fifty brigades were barracked together.³⁷ Able to do little more, brigade commanders found their 'essential duty' to be the training of the battery commanders, so brigade training suffered.³⁸ Operating in sections was unusual for most situations, but many senior gunners expected the divisional artillery to be broken up and attached, one brigade of guns per infantry brigade and sometimes one battery per battalion.³⁹ From 1907 (that is, as soon as Haldane's big divisions were finalised) artillery and infantry brigades were 'affiliated' for field work, simply the continuation of the old ways.⁴⁰ Tradition dictated artillery 'organization must depend directly upon that of the infantry', and this remained the underpinning of British artillery doctrine.⁴¹ Indeed, regulations called for detachment of batteries, 'sections or even single guns in close support of the firing line' when fighting in close country.⁴² Again, this would have not been necessary if there had been adequate signals equipment, or if the higher commanders had recognised artillery fire is more important than the presence of guns. This may have been a reason for leaving the batteries and brigades with large signals establishments. Splitting off the 18prs would have one benefit, leaving the CRA controlling only the howitzer brigade and the battery of 60prs, precisely those pieces least suited for direct fire support.⁴³ His signals resources were probably adequate to control this more limited force, and this may have been the unspoken intention. The other side of the coin was that these units required disproportionate amounts of signals to control, complicating the handling of the field guns, a bone of contention for more aggressive officers.⁴⁴

³⁶ SCM Archibald Papers, IWM, p61.

³⁷ HC Williams-Wynn, 'The Brigade System in the Royal Field Artillery', JRA 32:1 (1905), p17.

³⁸ Headlam, History, p226.

³⁹ Budworth, 'Co-operation with Infantry', p10.

⁴⁰ Headlam, History, p168.

⁴¹ JF Cadell, 'The Organization of Field Artillery', PRAI, 31:9 (1905), p348.

⁴² FAT1914, p260.

⁴³ Even this had exceptions, since FAT1912 and 1914 thought that even 60 pounders - which lacked gun shields - could be used in direct fire. FAT1912, p220; FAT1914, p229.

⁴⁴ FR Bingham, 'Lessons to be Learnt from the 1913 Practice Camps', JRA 50:11 (1914) (henceforth '1913 Practice Camps'), p488.

While direct fire was not intended to be the main method of the artillery,⁴⁵ the artillery was always aware that its purpose was the support of the infantry, no matter how this was to be achieved. There was too much talk of a 'spirit of close support' which was to be the parallel of the infantry's 'spirit of the bayonet', the artillery 'entering the "ring"', and FAT 1914 spoke of the artillery moving forward to support attacks and of 'the moral effect of batteries advancing boldly'.⁴⁶ The morale-raising effect of guns upon friendly infantry was emphasised, and maintaining the elan of gunners themselves.⁴⁷ This was part of both accepting the French doctrine and the defeat of the firepower school within the British army. Gunners were overly willing to sacrifice the characteristics of their weapons - long range and indirect fire capability - when the infantry wanted the reassurance of direct support. This was in keeping both with tradition and what regulations suggested.⁴⁸ It is outside the scope of this paper to consider infantry tactics in great detail, but they centred on morale and manpower - and especially on building up the firing line by weight of numbers - rather than exploiting mechanical means of fire. At this time the ratio of guns to infantry was actually being reduced, while Continental rivals were raising theirs. The British relied upon the mobility of the guns themselves to compensate for their declining numbers.⁴⁹ Shrapnel was peculiarly suited for producing a high volume of fire, since it could be worked out mathematically that a battery of six guns firing at four rounds per gun per minute would fire 9,000 shrapnel balls per minute. While no small achievement, this was simply doing the infantry's work for them, and purely in their terms. It cast all firepower in terms of bullets, not in terms of effect. With this in mind, the writers of the manuals clearly saw the artillery simply bolstering the infantry by running their guns up into the line and blazing away. Many gunners were more than willing to play this role, one colonel writing in an influential book 'There is absolutely no excuse for artillery remaining idle in face of the enemy; if they cannot see him, they must push forward until they do, even if this

⁴⁵ FAT1914 said (p175) 'Indirect laying ... *is the normal method employed in the field*'. original emphasis

⁴⁶ Budworth, 'Co-operation with Infantry', pp2, 9; FAT1914, pp252, 259. Budworth later served as artillery commander for Rawlinson's Fourth Army from May 1916 until the Armistice.

⁴⁷ Headlam, History, pp156, 170.

⁴⁸ See FSR1909, §105-6 and FAT1914, §145-49 and 154-76. Bidwell and Graham in Firepower cover the infantry-centred nature of British tactics in Chapters 1 and 2. I believe they under-estimate the amount to which the artillery had a doctrine, of absolute subordination to the infantry's wishes.

⁴⁹ JBA Bailey, Field Artillery and Firepower (Oxford: Military Press, 1989), p121.

entails their being used as machine guns'.⁵⁰ The artillery was perhaps over-sensitive to the sort of criticism that had been bandied around in the Russo-Japanese War, when Japanese infantry accused gunners firing from cover of cowardice, despite their effective shellfire.⁵¹ Rising officers could write that covered positions were for 'annoyance rather than business', and that 'the encouragement [of its own infantry] whether it be damaging the enemy or not' was the business of the gunner.⁵² The compromise suggested by FAT was concealed manœuvre into firing positions, but gunners were reminded that

Concealment, both as regards position and manœuvre, must invariably be foregone for adequate reasons. To support infantry and to enable it to effect its purpose the artillery must willingly sacrifice itself.⁵³

This was at least unambiguous, and most of the artillery clung to it.

The tactics adopted by the RA were also mirrored in their equipment. The mainstay was the 18-pounder field gun, a modern QF weapon with a gunshield. There were fifty-four 18-pounders in a division, organised in three brigades of three batteries each with six guns. This was the heaviest field gun in the world, both in terms of its weight and weight of shell, and it had been selected for its excellent ballistics when firing shrapnel. Indeed, shrapnel was its only round, and an HE round had been specifically rejected, part compensation being claimed because the 18-pounder fired a large shrapnel round with some explosive effect. There had been some idea to combine shrapnel with a smoke-producing agent, but technical difficulties and conservative thought - it was deemed a 'cuttlefish policy, too fanciful for our consideration', doomed it.⁵⁴ The 18-pounder had a very flat trajectory, which made it admirable for firing shrapnel to sweep through targets in the open. To abet the flat trajectory the carriage had been built limiting elevation and hence range; this would not be so troublesome in the intended direct-fire mission. This is another part of the shrapnel obsession: shrapnel lost much of its effectiveness at long ranges, so the British decided not to fire at long range rather than give up shrapnel. The flat trajectory greatly limited the guns' usefulness against targets in cover. Buildings were not so much the problem - the fuze could be set to burst after penetrating the wall - as entrenched infantry or even gunners behind gun-shields. For these

⁵⁰ Bethell, *Modern Artillery*, p270. This edition was an updated version of his 1907 book, and was essentially *FAT* rendered easier to read.

⁵¹ Bidwell and Graham, *Firepower*, p10.

⁵² JP DuCane, 'Cover and Co-operation', *PRAI*, 30:10 (1904), p361; CE Callwell, 'The use of Heavy Guns in the field in Europe', *PRAI* 31:1 (1904), p8. Both were brevet Lieutenant Colonels.

⁵³ *FAT1914*, p232; original emphasis.

⁵⁴ Headlam, *History*, p115. The addition of phosphorous had been suggested, but it was ruled illegal.

targets the British had adopted a light field howitzer, of 4.5" calibre and firing either HE or shrapnel. There was one brigade of three batteries, eighteen howitzers, in a division. Shrapnel had been insisted upon after the experience in South Africa and it was a useful shell, for the howitzers' more curved trajectory meant it could be used against troops dug-in or behind cover, or gunners similarly protected by their gun-shields. The HE round was intended to destroy minor field works and buildings. Conservatives held that since howitzers carried HE, field guns did not need to. However, shrapnel was the dominant munition, for the HE round had been designed to have the same ballistics as the shrapnel shell (and so be useful for ranging) when a different design would have allowed far greater explosive effect.⁵⁵ It was also hoped howitzers could flush enemy troops out of cover, to make them more vulnerable to gun shrapnel. Not only was this not probable against a steady opponent, it would take considerable amounts of time and ammunition. It was expected that howitzers would have to operate in direct support of the infantry, so the 4.5" had a gun-shield and firing shrapnel against charging infantry was practised. The last gun type in the division was the 60-pounder, with only one four-gun battery per division. It was a modern piece, but since it was intended to be used mainly at long range it lacked a shield. 60-prs carried mostly shrapnel, although having a proportion of HE. Thus the British artillery weapons were optimised to fight an enemy who stayed in the open and at moderate to close range. Against men in cover there was no good answer. Only a few guns per division had long range. For an enemy in close terrain the only answer was to move guns forward in direct fire. The final weakness was considering British artillery in isolation: there was no contemplation of what enemy guns might do to British ones. British guns could not seriously hurt foreign guns, and the converse was surely true - this was one of the unequivocal 'lessons' of South Africa. Of course it was not, and the error was compounded by the British obsession with shrapnel as a man-killing round.

The artillery had rightly rejected the idea that it could destroy all the enemy, and thus its tactical mission was aiding the infantry. Since forthcoming wars were expected to be mobile and fought for key points of terrain - and not on a continuous front nor in depth - the artillery took enemy infantry as their main target. Gunners would also fire their shrapnel at enemy artillery, but since tests had shown it to be minimally effective against guns or their shielded gunners, this counter-battery fire was very much secondary. Emphasis on CB work grew very gradually through 1914 and 1915 but markedly in late 1916. To get the infantry onto their objective the artillery would assist in gaining fire superiority, mainly through sudden and heavy concentrations of fire. Guns would be up amongst the infantry, firing at the same targets. Their concentrations would greatly affect enemy morale, shaking them just before the infantry

⁵⁵ *Ibid.*, pp113-4.

charged in with the bayonet. The safety distance within which guns could not support the infantry was set around 400 yards that would later prove to be far too great, especially against machine-guns. Despite the concern about artillery helping at the critical moment of attack, 400 yards was actually an increase from the previous figure of 200, at a time when other countries were reducing the distance.⁵⁶ A concern about the safety zone in front of the guns' muzzles reflected that they would be working up with the infantry, bolstering the battalion's inadequate firepower.⁵⁷ Once the infantry got too close for the 18-pounders to continue firing, the howitzers would take over, for their higher trajectory meant a narrower shrapnel danger zone. Meanwhile, the 60-pounders would be harassing enemy reserves and interdicting rear areas, or perhaps firing in enfilade from positions further along the front.⁵⁸

The main consideration in selecting firing positions was to be ease of fire. In view of the paucity of communications equipment and signallers (except in heavy batteries) this meant most guns would be deployed in sight of the enemy. Some saw little trouble in the lack of signallers, since batteries would deploy in line under the brigade commander's eye, where he could manually and digitally indicate their targets.⁵⁹ In this spirit, officers were told 'view of the enemy was the second priority of a good gun position, behind only being in range'.⁶⁰ It was possible even to complain about howitzers firing from 'too far back', when they adopted covered positions at practice camps.⁶¹ This was despite the howitzers' trajectory making them far more difficult to manipulate in direct fire than guns. Three categories of positions were defined, 'open' 'semi-covered' and 'covered'. An open position is self-descriptive, and a covered position kept the battery and its muzzle-flashes concealed; the semi-covered position was a compromise that kept the guns hidden, but indirect evidence of their position (such as flash or dust) would be visible. No official preference was expressed, but when FAT noted that covered positions 'increase difficulty of control, frequently necessitating artificial means of

⁵⁶ Bingham, '1913 Practice Camps', p499.

⁵⁷ Bethell, Modern Artillery, p138. He however thought infantry could work up to 100 yards from the target with gunfire and 50 yards with howitzer fire: p139.

⁵⁸ Much of this section was drawn straight from FAT1914 and Bethell, which was, on the whole, a popularised version with hints on what FAT 'really meant'.

⁵⁹ Ibid., pp142-3. Bethell might have done well at Sedan with such tactics, but not in South Africa. Bethell was 'dug-out' in 1914 and trained 25th Division's artillery until it went abroad in June 1916.

⁶⁰ Ibid., p270.

⁶¹ Bingham, '1913 Practice Camps', p488.

communication ... and the use of plotters', the implication was clear.⁶² Such positions were not for ordinary use - not least because most batteries would have been stretched to find a plotter - and writers struggled to find any reason for them. Counter-battery fire, mainly a howitzer task anyway, was considered the likeliest, but was itself a very low priority.⁶³ In some ways counter-battery effect would be had by drawing enemy fire onto exposed British batteries and off the similarly exposed infantry. The heavy battery was seldom expected to engage over open sights, but it at least had double the number of signallers - being expected to work in sections - and was more familiar with indirect fire.⁶⁴

The exception to the tendency of relentlessly pushing forward was the Royal Garrison Artillery, who had the quadruple responsibility of coastal artillery, siege artillery, mountain artillery and the few heavy batteries. Most of these duties did not require horses, and the RGA tended to put the time saved from stables duties towards developing its technical standard in long-range gunnery. Garrison artillerymen also had a three-month gunnery course after commissioning while their Mounted Branch counterparts received only one month.⁶⁵ In November 1913 an RGA major was laughed at for suggesting that batteries take a thermometer and barometer into the field, and the lecturer replied that he could not agree with a 'plea for greater accuracy ... the gun is the best range-finder, better than all the scientific instruments in the world'.⁶⁶ With the Expeditionary Force the only RGA units would be the heavy batteries with the 60-pounder guns, but there had long been recommendations that reinforcing RGA units be predominantly howitzers. These were held to be more useful in the attack and still useful in defence; there may also have been an undertone of wishing the less-dashing weapons off on the Dismounted Branch.⁶⁷

⁶² p297.

⁶³ Bethell, *Modern Artillery*, p325. However, counter-battery could still be a direct-fire problem. FDV Wing, 'The necessity for a High Explosive Shell for Field Artillery', *JRA* 33:6 (1907) pp271-3.

⁶⁴ *Field Artillery Training 1906* (London: HMSO, 1906), pp109, 141.

⁶⁵ LA Hawes Papers, Imperial War Museum (henceforth IWM), p22.

⁶⁶ Bingham, '1913 Practice Camps', pp495, 501. The RGA major also noted that *FAT* mentioned correcting for environmental conditions, but did not say how to do so.

⁶⁷ EG Nicholls, 'The training, organisation and equipment of Companies of the Royal Garrison Artillery with medium guns, and howitzers, and their tactics in future field operations', *PRAI* 28:2&3 (1901), p103. This was the topic of the annual Duncan Essay; Nicholls won the Gold Medal and was typical.

It will be noted that the discussion so far has looked only at field artillery, and mobile operations, either attacks or encounter battles. These were expected to be the norm, and even defensive operations received little attention; the British army compartmentalised its thinking very thoroughly. There was no anticipation that siege artillery would actually participate in a war: although it might 'be added [to the Expeditionary Force] as circumstances may demand', there was no notice of any type of siege artillery in the Field Service Pocket Book.⁶⁸ This is mildly curious, for while there was very little siege artillery in the British army,⁶⁹ it had participated in the 1913 manoeuvres.⁷⁰ The tactical role of siege artillery was also nebulous, since while it was intended to destroy obstacles this was not practised.⁷¹ This is doubly odd, for it was the only way siege howitzers were to be used in the field, by driving in outworks of a fortress.⁷² In keeping with the British obsession with shrapnel, siege artillery were issued shrapnel 'as it is the personnel that has to be overcome before the position, whatever it may be, can be captured'.⁷³ Siege artillery had separate command arrangements, with their own brigades but coming under a 'commander of the besieging artillery' in a siege. Communications would be a sticking point; with three siege brigades there were only resources to link two brigades - the RE were expected to do the rest.⁷⁴ It is not clear to whom the brigade commanders were responsible during mobile operations, but presumably straight to GHQ unless assigned to a division. It ought to be noted that siege artillery was technically part of The Siege Train, which was not part of the Expeditionary Force. Stories circulated that this was because siege guns could not be landed across a beach, which might be necessary for an expedition to some parts of the Empire.⁷⁵ However, it must be judged unlikely that siege guns

⁶⁸ Garrison Artillery Training 1914 (London: HMSO, 1914) (hereafter GAT1914) vII, p1; Field Service Pocket Book 1916, (London: HMSO, 1916) pp8-10, 39-40. While the FSPB was intended for use below divisional level, little notice was taken of the HQRA.

⁶⁹ on mobilisation, four batteries of 6" howitzers and two of 9.45" howitzers

⁷⁰ Headlam, History, p227. Each side had a battery, with civilian drivers. They were judged to have knocked each other out, avoiding them embarrassing the rest of the forces. Meanwhile, their brigade commander had nothing to do, as his brigade was split up. AH Webb, 'Duties of a Heavy Artillery Brigade Commander in the Field', JRA, 46:10 (1918), p447. Webb was one of the battery commanders.

⁷¹ Headlam, History, p249.

⁷² Garrison Artillery Training 1906 (London: HMSO, 1906) vII, p5 made this explicit.

⁷³ Headlam, History, p255. This was in 1906; shrapnel was being phased out for siege guns by 1914.

⁷⁴ GAT1914, vII p144.

⁷⁵ AF Brooke, 'The Evolution of Artillery in the Great War', JRA, 51:5 (1925), pp256-7 (hereafter Brooke, 'Evolution').

would be needed campaigning in an area so remote the Expeditionary Force had to be landed on a beach. This argument might have been real, but it was not credible.

As to artillery command arrangements in case of operations somewhere between a siege and fully mobile warfare, there were no particular instructions, but it was felt that methodical progress 'should make the CRA's task of fire-control somewhat easier'.⁷⁶ The extra time available would allow of the improvement of the communications network, which would significantly enhance the role of the CRA.⁷⁷ This suggests that decentralisation and detachment were recognised as harmful to the artillery's advantages, for central control would allow employment 'as required by the exigencies of combat'.⁷⁸

Haldane's reforms had created a real Army Corps and provided for two others. However, no need was foreseen for artillery commanders at any level above Division. The last time any division of responsibilities had been laid out was in the 1902 FAT, under the old Corps system and even before QF guns were adopted. It is unclear why this system was dropped after 1906 and not picked up for a decade, but in a sense the larger, all-arms, divisions needed less support from above. After the 1907 reorganisation, there was very little between divisions and the War Office: GHQ had a very meagre complement and Corps only operated during manoeuvres. In the War Office, the Master General of the Ordnance was responsible for weapons development and procurement, and related administrative tasks, but had no role in operations. Even divisions only had two permanent general staff (not artillery staff) officers, the other four only being assigned on mobilisation. On the other hand, there was very little non-divisional artillery to require handling. There was the horse artillery, which would become part of the Cavalry Division in wartime, and the siege artillery which was intended for sieges, which were aberrations anyway. The only gap would therefore be regarding the 6" (medium siege) howitzers and any heavy guns rounded up and used in the field.⁷⁹ These guns were expected to be sufficient to avoid needing to deploy The Siege Train for all but the most formidable of fortresses. In such circumstances, it did not seem unreasonable to have only an 'Artillery Adviser' at Corps HQs and GHQ - without so much as a clerk to help with

⁷⁶ Weber, 'Notes and suggestions', p422.

⁷⁷ Bethell, Modern Artillery, pp343, 226.

⁷⁸ Ibid., p343.

⁷⁹ HCCD Simpson, 'The Future Role and Organisation of our Siege Artillery in War', JRA 32:9 (1906), pp385-91.

paperwork - and to have his role ambiguous.⁸⁰ These positions would also only be filled upon mobilisation; until then the only artillery higher staff officer below the War Office was the 'Staff Officer for Artillery' at Aldershot. His wartime position was not as a staff officer nor adviser but as CRA for the Cavalry Division.⁸¹ With these presumptions, it was reasonable in 1913 to consider the brigade to be the higher level of command, leave out the divisional heavy battery, and not refer to an artillery officer above division level. Larger forces could simply be noted as having 'no CRA'.⁸²

Thus, there was no framework for handling artillery above divisional level, and only a weak one for handling the divisional artillery. It was assumed that artillery would be entirely subordinated to the infantry in battles of manoeuvre, which was the only form of battle that received adequate attention. While some provision existed for formal sieges, there was nothing to help cope with the problems that caused mobile warfare to seize up in 1914. Pious hopes were expressed that a set-piece attack would allow more centralised control of the artillery, but the means for controlling the artillery were as deficient for methodical attacks as they were for mobile actions.⁸³ Underpinning the artillery's role was its - proper - subordination to the infantry, but this principle was taken too far and the artillery was expected to do what the infantry did and up amongst the infantry. This ignored the artillery's nature, for their weapon is the shell and not the gun, and shells can be delivered to a target that is out of sight. Guns need not be concentrated in order to concentrate shells.

The 1914 campaign was opened on these principles and fought along them as long as it could be. Change was thrust upon the artillery by events and was certainly not sought. When the Expeditionary Force was dispatched to France it took its integral artillery and nothing else; The Siege Train was not wanted. However, siege batteries were soon dispatched, arriving as early as mid-September for the Battle of the Aisne. Not just the Siege Train's elements were sent, various guns scraped up from coastal batteries, from dépôts, and trial pieces. Horse and Field batteries fought as they had foreseen. They were administered as brigades and paired with

⁸⁰ SWH Rawlins, A History of the Development of the British Artillery in France 1914-1918 (Henceforth, Rawlins, History), p1.

⁸¹ He would draw his staff from the Riding School: his Staff Officers were seen as gallopers not thinkers.

⁸² HW Wynter, 'Higher Artillery Command in War', JRA 40:2 (1912), pp57-68.

⁸³ Indeed, perhaps more so, since in mobile operations visual signalling could partially compensate for the lack of telephones.

infantry brigades, but they were fought in batteries.⁸⁴ Howitzers too were handled this way. At times it was necessary to push forward a gun to fire at a given German position, or a howitzer to demolish a building.⁸⁵ There was no hesitation among gunners to push themselves forward, nor was there hesitation in the infantry asking for them. Indeed gunners were too willing to agree, as at Le Cateau where they deployed in full sight of the Germans and suffered heavy losses in men and guns. It is sometimes overlooked that only half the guns at Le Cateau were forward; the other division used positions on the reverse slope where they were safe. However, there they were less able to effectively engage the Germans, communications with the infantry across the ridge being more difficult.⁸⁶

The BEF did not have much fighting on the Marne, but in the intersected country of the Aisne there was a great deal of trouble for the artillery. Because of the pre-war emphasis on shrapnel and its consequent flat trajectory British field guns had great trouble in the narrow valleys. They either had to be well forward - sometimes on the far side of a stream - or so far back shrapnel lost effectiveness. Communications were stretched to the breaking point and senior officers often found themselves shuttling around maintaining contact with their subordinates rather than commanding. 18prs were generally kept up with the infantry, with CsRA responsible more for supply than employment. Communications more often meant the CRA visiting rather than ringing. One ADC noted 'anyone of us who wanted to consult any [divisional] staff ... had to drive or ride over to see him, often a matter of miles'.⁸⁷ Exposed positions were all that was available and were employed, no matter the cost. Guns were used as infantry reinforcements, a reminder that the army saw them as simply another kind of bullet-deliverer.⁸⁸ As Brooke later wrote there was no combined-arms planning; the infantry decided what they wanted and others had to do their best to conform.⁸⁹ Howitzers were immensely useful in this terrain but were in short supply. When the first 6" howitzers arrived they were immediately attached to divisions rather than trying to keep a central firepower reserve.

⁸⁴ Sir James Edmonds, compiler, History of the Great War Based on Official Documents by Direction of the Historical Section of the Committee of Imperial Defence: Military Operations France and Belgium, 1914 vol 1 (London: Macmillan 1922). Henceforth referred to as OH, with year and volume number, thus: OH1914v1, pp102, 106, 310, 318-9, 323.

⁸⁵ Ibid., pp134, 186.

⁸⁶ Shelford Bidwell, Gunners at War: A Tactical Study of the Royal Artillery in the Twentieth Century, (London: Arms and Armour Press, 1970) (henceforth Bidwell, Gunners at War), pp17-19.

⁸⁷ SCM Archibald papers, IWM. This was in 3rd Division.

⁸⁸ OH1914v2, p134.

⁸⁹ Brooke, 'Evolution', p261.

As the Germans were forced back and the BEF pushed on towards Ypres this pattern held. Infantry and cavalry brigades fought with 'their' guns attached, CsRA had 60prs and howitzers under their command. One CRA was given the grand total of two batteries to command on 'special tasks'.⁹⁰ Sometimes field howitzers were given to infantry who had a particularly strong position to attack. This gave the infantry firepower but meant that other units had to go without until the batteries were re-distributed. Occasionally batteries were used in quantity, as when Sir John French supervised the concentrated fire of all five heavy batteries on various German batteries.⁹¹ This sort of concentration was extremely rare, since there was no mechanism for concentrating fire across divisional boundaries.⁹² CsRA might co-ordinate a cross-fire either between themselves or within their own sector.⁹³ Since there was no artillery chain-of-command, it required a Corps commander or indeed French himself to arrange things. With their wide discretionary powers, Corps commanders could centralise artillery. Haig, commanding I Corps, on the 18th September delegated to Horne (his Artillery Adviser) 'the organization of the artillery fire and the co-operation between artillery and aeroplanes'.⁹⁴ Horne spent much more time working with the RFC than organising artillery fire. Every day flying was possible he personally went to the aerodrome and took reports from pilots. Orders were then passed to the CsRA, as Horne was not a commander. Haig formed a 'Special Artillery Group' in I Corps, a mixture of field artillery, siege howitzers and medium guns, which 'acted directly under [Haig's] orders'. This was an encouraging example of a centralised fire reserve, but Haig had to do this personally rather than being able to use a subordinate. Having to directly command his personal artillery reserve must have taken some of Haig's time away from the bulk of his duties. Furthermore the rest of the BEF was free to emulate this or not, as they saw fit.

As movement began to slow in October and fighting at Ypres became nearly static, the artillery had to adjust. Defensively artillery was pulled back perhaps a mile behind the infantry line. Eventually it became unusual when guns were up with the infantry rather than when they

⁹⁰ 4th Division Operation Order No.12, 18/12/1914, Field-Marshal Sir Archibald Montgomery-Massingberd Papers (hereafter Montgomery-Massingberd Papers), Liddle Hart Centre for Military Archives, King's College London, (henceforth LHC), f32.

⁹¹ OH1914v1, p419.

⁹² Thus it was remarkable when this did happen. Ibid., p451.

⁹³ OH1914v2, p82.

⁹⁴ 'Operations of the 1st Corps on the River Aisne, 13th September to 30th September 1914' (hereafter 'Operations of the 1st Corps, Aisne'), Field Marshal Baron Horne of Stirkoke Papers, IWM (hereafter Horne Papers)

were not.⁹⁵ The key moment seems to have been when the infantry entrenched. The risk of hitting friendly troops was much reduced both because they were protected and their positions were known. Liaison did not, therefore, have to be quite so intimate and telephones or visual signalling could safely be employed. Liaison also broke down when the infantry began suffering heavy casualties. Infantry battalions could no longer hold as much frontage as 'their' guns could support. To remedy this the front was organised into sectors, with the artillery under the control of whatever force happened to hold that sector. Some linkage still remained, and guns might fire only in support of 'their' troops.⁹⁶ Sectors also led to the development of 'SOS' fire, whereby a signal from the infantry brought down fire from whatever guns covered that sector. Also, brigades in reserve would have an allotment of guns, although this might only be gunners resting.⁹⁷ One lesson had been learnt from the early battles regarding forward artillery positions. They were now frowned upon and considered 'emergency' measures that 'possess no advantage over covered positions'.⁹⁸ Some took a prejudiced view of this, lamenting that 'concealment has been forced upon our artillery,' as if the Boer War had not done this as well.⁹⁹ It was decreasingly common for guns to be employed in sections or singly; batteries generally fought together. Heavier pieces were the exception to this and howitzers were doled out as needed to batter houses or German entrenchments.¹⁰⁰ At this point field guns would still be affiliated with the infantry, leaving the CRA only howitzers, the heavy battery and any attached siege guns.¹⁰¹ CsRA managed to co-ordinate their forces and communications gradually improved. Brigades were connected to the CRA so that defensive fire could be shifted where it was most needed. I Corps found enough telephone cable to link all three of its CsRA, but still not to the Corps Artillery Advisor.¹⁰²

Using artillery primarily to support the infantry on its immediate front was a great waste of effort. Many guns might be in range, but only a few would fire. Since the BEF was

⁹⁵ OH1914v2, p336.

⁹⁶ OH1914v2, p272.

⁹⁷ Ibid., pp249, 227.

⁹⁸ 'Notes on Artillery in the Present War', 2/10/1914, G Helps Papers, IWM.

⁹⁹ '3rd Army Corps Tactical Notes', c9-10 14, Montgomery-Massingberd Papers, f32. (henceforth '3rd Corps Tactical Notes')

¹⁰⁰ OH1914v2, pp165, 274, 338, 408.

¹⁰¹ Ibid., p206.

¹⁰² Ibid., p263.

holding a salient, fire could be concentrated from the centre to any part of the front. Instead, guns were split up in packets. There were problems in communications, especially with the amount of telephone cable available, but the situation was improving. The diffusion of guns was necessary because of the communications difficulties, as the army realised. However, it was too soon for any corrections to be made.¹⁰³ Also, with the scarcity of shells - and batteries were withdrawn from the salient rather than be exposed to German fire to which they could not respond - central control would have brought more efficient use. In general scarcity tends to cause centralisation, but the British did not do this and seem to have specifically avoided the idea.

The Artillery Advisors at Corps HQs were still lacking any purpose and tended to be used as spare senior staff officers.¹⁰⁴ Even when several divisions were involved in an attack - when planning might have been expected - AAs were not involved. It was possible for an AA to observe divisions preparing to attack without the slightest conception they should take part, even when 'there was not enough preparation or organisation'.¹⁰⁵ Instead artillery support 'was left to the discretion of the divisional commanders'.¹⁰⁶ There was still a great concern that the proprieties of command not be slighted. GOsC were the commanders of their divisions, and nothing must be done to interfere with that. Corps and GHQ left divisions to their own devices, refraining from interference.¹⁰⁷ Since brigades had been the main artillery unit, CsRA generally were too reluctant to give orders and co-ordinated instead of commanding. When the BEF was moving, this was not so much of a problem. Since signals could not cope, artillery had to be de-centralised. This was not just a failing of too few signallers or too little cable, although these contributed. The same troubles would be experienced in 1918 when all aspects of communications had improved. However once operations centred on Ypres there was no ability to assert command. There was an artillery chain of command within the division, but it was tenuous. Outside the division there was nothing and inter-division co-operation depended on generosity or the already busy Corps commanders finding time.

¹⁰³ 'Further Notes on Artillery in the Present War', 11/14, Helps Papers, IWM.

¹⁰⁴ Horne at one point acted as replacement for a CRA rather than as Artillery Adviser. 'Operations of the 1st Corps, Aisne'.

¹⁰⁵ AH Hussey, The War Diary of Brig. Gen. AH Hussey, RA, 1914-1918, Royal Artillery Institution Military Document 1175, 18-19 12/14.

¹⁰⁶ OH1915v1, p18.

¹⁰⁷ see also Bidwell and Graham, Firepower, p100.

The pre-war ideas regarding artillery's role were also changing. Direct-fire shrapnel was soon found not to be a panacæa for all tactical problems. Neither was killing men the central dilemma. Targets - whether human or material - were in cover. First they had to be located, then hit. Shrapnel lacked the blast effect required. The lack of an HE round for the 18pr was keenly felt, although experimental rounds were introduced. The demolition of obstacles to the infantry's movement - which came under the pre-war heading of preserving the infantry's mobility - took on a new aspect. Now it was necessary to destroy houses and entrenchments. Even the RGA (who were responsible for sieges) had not practised on such targets so the artillery had to start from a *tabula rasa*. Shells were so scarce there were none to be wasted determining how much was necessary to destroy obstacles. Experience was obtained from battlefield results, but it cost lives when things went wrong. Worse for the long term, the impression developed that the German trenches and barbed wire were the obstacles to movement rather than the German infantry which they sheltered and protected. The emphasis in late 1914 was changing from killing or suppressing the German infantry to destroying the German positions and any troops that happened to be inside them. This erroneous view would increase in 1915 and peak in 1916, but was clearly beginning in 1914. Counter-battery firing was now more necessary than ever but even so was less urgent than other problems.¹⁰⁸ The priority remained infantry support, which was somehow offensive, while CB work was defensive and inferior.¹⁰⁹ Shells were precious and had to be used on the most dangerous target, which was usually the German infantry. One very progressive development was the use of aircraft with artillery. The technology was primitive even by the standards of 1918, but the army realised this was a critical area to develop. Everybody worked on the problems: troops in the field, GHQ and the War Office.

The end of the year saw the first breathing space for the BEF, the first pause for thought. During operations there was little leisure to consider what should be done differently, and artillery responded as haphazardly as other arms to the changed conditions. No one in the British army had any experience whatsoever in handling such a large force in the field. Boer War experience was not much use in radically different conditions, with officers commanding units far larger than they had before. Without the time for reflection it should be no surprise there was little change in opinions. Artillery was still to assist other arms; it would throughout the war. Some of the most outdated views - using artillery as just more infantry firepower - was out; direct fire was out, but these were forced upon the artillery and the army. Other

¹⁰⁸ see chapter 5.

¹⁰⁹ '3rd Corps Tactical Notes'.

problems could not be solved yet, if ever - and of course men did not know a given problem would be solved in 1916 or 1917. Until solutions on traditional lines had been tried nobody was calling for changing everything. After all, British arms had been moderately successful in 1914, and could expect to be so again. After valiant, if not entirely successful opening battles the 'Miracle of the Marne' opened an Allied counter-offensive. Even at Ypres the Germans had been checked after throwing forward their last reserves. While the BEF could not claim to have solved trench warfare, neither had they made a large effort to. Until then they would not know whether their methods would be successful, and there would be no change until then. In the circumstances, artillery carried along on pre-war lines.

Preparing the Attack

Part I: 1914-1916

Before the Boer War a preliminary bombardment was a customary part of a battle plan. Like so many other ideas this was discarded during that war, emphasis shifting to close support of the infantry. By 1914 clear and separate rules existed for field battles and sieges. In ordinary situations there was no preliminary bombardment and the target of any bombardment was the opposing force, never fixed defences. In the opening months of WWI this worked tolerably since neither side more than scratched trenches but by the spring of 1915 the Germans had elaborated their defences so that barbed wire, parapets and other obstacles impeded British movement and fire. Unaccustomed to these, the first reaction was to see the obstacles as the problem and restore a preparatory bombardment. The first efforts were mechanistic but experience was gained over the next two years. New weapons were designed and new methods adopted. Eventually German defences would be dealt with as much as necessary, speeding the advance against weak defences but pulverising and saving lives in strong sectors.

Field Service Regulations, the Army's basic guide on how to fight a war, saw fighting as either mobile operations or siege warfare, with minimal overlap. Fitting with Haig's conception of war as a struggle of will and morale, it set the main goal of artillery as support of the infantry assault. It would be a lengthy process for the infantry to work their way forward to charging distance, during which the artillery would 'help the infantry to maintain its mobility and offensive power'.¹ Of course even in mobile warfare defenders might occupy buildings, entrenchments or cover of various types and some allowance was made. Howitzers and heavy guns carried HE shells, and because of their trajectory howitzers could search trenches. In a pinch percussion shrapnel could be used against buildings, bursting inside.² Throughout the section on mobile warfare obstacles were dismissed: barbed wire was simply not mentioned despite its use in South Africa and Manchuria.

Sieges were considered an altogether different kind of operation, mutually exclusive with field battles. Even here bombardments were discouraged and 'should rarely directly precede the ... assault'.³ Sieges were conceived as an attritional type of battle and inflicting losses was the field artillery's main employment although there might be circumstances for

¹ FSR1909, p135.

² Ibid. pp16-7; FAT1914, p228.

³ FSR1909, p166.

them to reduce 'the resisting power of fortified localities'.⁴ Cupolas, parapets and trenches were the expected problems and barbed wire was again ignored. The main emphasis on enemy morale was sound, for if the enemy were disinclined to fight, strong positions were useless. The army had spent more time thinking about field battles than sieges but the real failing in pre-war thinking was more in compartmentalising the two than in addressing either badly. Encounter battles were expected, not set-piece attacks. If the enemy chose to defend, the BEF would be stymied unless it could find an open flank. On a larger scale, if operations were somewhere between a siege and a mobile battle the British army had no ready response.

A bombardment before an attack was in a sense politicised like no other aspect of operations. An attack always has a purpose and the means are calculated to that end. A bombardment should fit in with the type of operations chosen. However logical this sounds with hindsight, it did not always work this way, especially earlier in the war. If a general insisted on trying to break through, yet asked for the wrong sort of artillery support the gunners would do what they were told to - and of course they were learning themselves. Artillerymen were convinced of their subordinate position vis-a-vis the combat arms, and did what they could to help the infantry and cavalry, even if the plan was not the most effective possible.

In 1914 the BEF mobilised and went to France without a single siege gun. Guns were used just as pre-War regulations laid down, and HE proved effective against houses.⁵ No formal siege developed but it was quickly evident that more firepower was needed and The Siege Train - referred to in capitals - and assorted other heavy guns trickled out to France. 6" howitzers were very effective against the slight German trenches, although once the Allies lost the initiative it became more difficult to co-ordinate them into the fighting. By December 'The Siege Train' was a defunct concept and the Committee on Siege Artillery Material, only three months old, was dissolved.⁶ It had done its job, diligently calculating the number of guns needed to break the German frontier forts. Its results were fantastic not only considering the military situation but also munitions production. Perhaps its most original conclusion was the need for a sapper Major-General to command The Siege Train, thus guaranteeing an Engineer job.

Instead of a properly organised Siege Train, the siege pieces were shipped to France as rapidly as batteries could be made efficient; in peace-time they were held below established

⁴ FAT1914, pp230-1.

⁵ OH1914v2, pp113, 338, 408.

⁶ WO33/701, Report of the Committee on Siege Artillery Material.

strength and lacked any horses. They generally proved popular in action, although first impressions were prejudiced by pre-war views. Haig found he could have all the 6" howitzers because no one else wanted them, considering them insufficiently mobile.⁷ Sir John French spent considerable effort in September and November trying to pry just a few heavy guns out of the War Office, even begging for old muzzle-loaders. From being an encumbrance to operations heavy guns were suddenly vital: 'if heavy ordnance is not forthcoming when required future operations may be seriously handicapped and protracted, and increased loss of life may result'.⁸

Tactically the heavy artillery was used as it should have been, against strong positions, fortified buildings and trenches. This was combined with field artillery and small-arms fire intended to kill and demoralise the defenders; the two were complementary. Artillery preparation in these terms was quite simple, a few minutes shelling before the infantry cheered and charged. German positions were not elaborate nor were there enough shells to do much more. In the desperate fighting around the Ypres Salient, time to organise, let alone prepare an attack was a rare luxury and seldom was more achieved than a few minutes of shellfire. Once the German pressure eased the BEF had time to recover and contemplate how they should conduct their own war-winning offensive.

The first attack planned was towards Messines Ridge in December 1914. While pathetically unsuccessful, it represented the state of the art, which still included no wire-cutting and no artillery preparation.⁹ The CRA involved thought a preliminary bombardment would sacrifice surprise - he did not differentiate between five minutes or five days.¹⁰ Sir John French merely noted the heavy artillery 'will support the general attack', and eventually that the attack was 'assisted by a heavy artillery bombardment'.¹¹ The whole tone of the operation was amateurish and looks like a student scheme with little more thought given to either artillery or cavalry beyond them vaguely 'supporting' the attack.¹² The lack of any attention to wire-cutting is strange, but largely a reflection of the acute shortage of shells, and quite desperate

⁷ diary, 23 9/1914.

⁸ WO32/5150

⁹ OH1915v1, p18.

¹⁰ AH Hussey Diary, RAI Military Document 1175 (hereafter Hussey Diary), 18/12/14. Hussey also commented on the attack rather as an observer, without suggesting he should have involved himself more.

¹¹ Field-Marshal Earl French of Ypres diary, IWM (hereafter French diary) 10 & 14/12/14.

¹² GHQ OA816, 12/12/14, WO95 688.

expedients were tried to get the infantry over the German wire. Trench destruction was, however, considered more important. Smith-Dorrien, in letters of that week, referred to 'completely smashing to pieces the enemy's trenches' and 'blowing in any trench the enemy can make'.¹³ Haig, a few days later, thought a bombardment was necessary 'to destroy the enemy's protection'.¹⁴

Obviously blowing in German trenches would kill Germans, destroy machine guns and demoralise the defenders, but Smith-Dorrien's ideas go back to the old dichotomy of mobile warfare vs. siege warfare. He saw trench warfare as a very temporary circumstance, shortly to be corrected. After the break-through, flanks would reappear and 'normal' fighting would return.¹⁵ While Smith-Dorrien was referring to an attack in December 1914, this view of trenches and barbed wire as the obstacle to open warfare would prevail through 1915. Pre-war conceptions of mobile warfare still held: defences were generally seen as obstacles needing to be swept away so the opposing infantries could fairly test their mettle on the 'moral battlefield'.

So it was in January 1915 that experiments were conducted on the wire-cutting potential of field guns.¹⁶ Replicas were built and shot at under realistic, if somewhat optimistic, conditions.¹⁷ Later, front-line experiments were made, in that the results of ordinary operations were carefully noted and circulated.¹⁸ Haig personally pored over these reports in planning the battle of Neuve Chapelle.¹⁹ However before the attack there had been no experiments about bombarding trenches. Opinions varied regarding the quantity of shell

¹³ Smith-Dorrien to von Donop, 20/12/14, WO79/84; to French, 19/12/14, WO159 215. see also Smith-Dorrien's memo, 10/12/14, WO95/630.

¹⁴ diary, 6/1/15.

¹⁵ Smith-Dorrien to French, 19/12/14, WO159/215.

¹⁶ The French had experimented in mid-December 1914, and the BEF had copies of the report in a week, but the French results did not transfer directly. French diary, 27/12/14; Montgomery-Massingberd papers, LHC, f38(2).

¹⁷ In light of the later shell-shortage, shrapnel performed better than HE in these tests. 'Dossier', Sir Stanley von Donop papers, IWM. There were also tests of chain-shot to determine its utility in cutting wire, which turned out to be poor. SUPP6/169, Annual Report of the President of the Ordnance Committee.

¹⁸ Montgomery-Massingberd papers, f38(2); WO158/275, 29/1 15. Smith-Dorrien was particularly interested.

¹⁹ diary, 28/2/15.

necessary to destroy the German trenches, especially among gunners.²⁰ Without data, Haig felt free to consult widely, even outside the chain of command. In the end he demanded a plan and one was provided.²¹ It was poorly put together: only through chance were the twin elements of trench bombardment and wire-cutting given the same amount of time. For both complete destruction was the goal - despite historical interpretation since that neutralisation was the purpose of the bombardment. Planners had no data whatsoever for bombarding trenches and Rawlinson himself scribbled the details down, which seem finally to have rested on how long the wire-cutting would take.

The initial success would blind the officers included to the flaws in the planning. It is very important to keep in mind that destruction had been the intention, frustrated only by the lack of means. That the plan worked was a combination of skill, judgement and beginner's luck, but unfortunately it was taken as a template that need only be repeated for future success to be guaranteed. The reason for the short bombardment - lack of material - was glossed over. In investigations after the battle, the failure on the left flank could be explained by bad luck and inaccurate shooting, thus further masking the fundamental lack of material. There was inconsistency in the British command, on one hand passing on information on how success had been gained, on the other assuming the lessons would hold true for the rest of the war, although that was not expected to be far in the future. Oddly, in doing this senior British commanders compromised their belief in personality-dominated warfare, thinking they had a template and assuming the enemy would not react to British success. Both First Army and GHQ circulated lessons learnt so the success might be repeated in the future.²² Not content with success, after-action reports were studied and fresh wire-cutting experiments conducted a week later.²³

The senior gunner in the BEF, John du Cane, drew different lessons from Neuve Chapelle. He advocated limiting the infantry attack, a procedure later called bite-and-hold.²⁴ Essentially this suggested the war was not going to be won quickly so it should be won efficiently, and it looked more towards mechanistic warfare than leadership and morale. Not all those who

²⁰ Rawlinson (commanding the attacking Corps) wanted several hours bombardment, Mercer (First Army's Artillery Adviser) several days. WO158/374.

²¹ diary, 1-3/3 15.

²² eg Montgomery-Massingberd papers, f38(2).

²³ WO106/388B, Indian Corps at Neuve Chapelle; Montgomery -Massingberd papers. Haig and Hussey diaries, 17 3 15, Mercer report to Haig, 21 4/15, WO95/155.

²⁴ memo, 15/3 15, WO158/17.

rejected bite-and-hold were reactionary: as a strategy it had flaws. First, it would not be simple to sell the nation 'jam tomorrow', especially if the experts mis-judged when to gear for maximum effort. This they did: even in the autumn of 1918 there were earnest discussions whether the war would be won in 1919 or 1920 and GHQ worked on demobilisation schemes from the autumn of 1916. Second, it was possible to mistake what was a bite or a breakthrough. Rawlinson - something of a 'biter' - wanted to take the village of Neuve Chapelle in two bites (c300yds each) but when planning the Somme offensive he argued 2000yds was a bite.²⁵ Haig was probably right to go for Neuve Chapelle all at once, but he was wrong about the Somme. Third, switching to bite-and-hold meant rejection of the army's whole concept of warfare, and making a leap in the dark. In an organisation as ponderous and slow to change as an army, this was unlikely, especially as Neuve Chapelle had germs of success in it. The 'old guard' could plead this success and call for improvements: surely it was better to iron out the flaws in the present system than to junk everything in favour of something equally untried. Fourth, it would be a grievous mistake to think of two diametrically opposed schools of thought. Officers were enormously busy with myriad other problems; many drifted along without thinking this question through. It is easier in retrospect to measure ideas against a standard and categorise people; more typically they agreed with bits of both.²⁶ While du Cane wrote the crucial memorandum, it would be a great mistake to think this argument was artillerymen against the rest of the army. Gunners did not flock to du Cane's corner and many later would criticise the concept he advanced when they rose to influential positions.

Simply repeating the pattern of Neuve Chapelle was a grievous error, for the Germans took the simple step of reinforcing their trenches and thickening their wire before the next British attack. It consequently failed with heavy loss. One element had been thoroughly tested, using 18pr HE shells to supplement howitzers against trenches and parapets, the first tests of trench demolition. Previously only howitzer HE was trusted against these sturdy targets, but on 20 April careful tests were conducted and field gun HE proved adequate. It was hoped this would mean larger attacks, since 18prs could supplement the limited number of howitzers.²⁷ However the tests were performed against parapets like those at Neuve Chapelle, as if the Germans would not react to that battle. There was a curious dichotomy in the later stages of the battle of Aubers Ridge. Some further attacks were planned, both where earlier ones had

²⁵ The distance would vary with the number the British guns, the strength of the British infantry but also the German defensive scheme.

²⁶ for instance Smith-Dorrien's idea for artillery to bludgeon the Germans out of successive trenches thereby creating a breakthrough: note 13 supra.

²⁷ Haig and Hussey diaries, 20/4/15.

failed and in new areas. When renewing an attack there was to be a further bombardment, presumably because surprise had been lost. But when launching a brand new attack there was no destructive bombardment planned, only a brief burst of fire. How this was going to work is uncertain, but it is clear officers thought of two different types of attack; again compartmentalised thinking. A note from GHQ referred to 'rapid assault' and 'deliberate methods', now preferring the latter.²⁸ It was GHQ that finally quashed the plans for renewing attacks, uncharacteristically insistent on the point, emphasising

It is of great importance that the infantry should not attack until the artillery preparation has been effective. The results of your attacks on the 9th show that the artillery preparation was not effective, and the Commander in Chief does not feel sure that sufficient time is being allowed on this occasion.²⁹

Haig could see the criticism was justified and he now focussed on accurate bombardments, complaining that Germans could survive even very heavy shelling.³⁰ He 'had no intention of ordering any infantry under [his] command to attack until the hostile position was thoroughly prepared'.³¹ Haig's error had been in using 18-pr HE to try to break the restrictions imposed by lack of heavy howitzers. He was to continue his optimism about 18-pr HE but never again base a whole battle upon it.³² Artillery officers had been more dubious of its performance before the battle, but had loyally accepted the decision of higher authority. Even when Haig intervened, adjusting 'thoroughly' to 'what is available' - as he did later that same day - Birch did not complain; he can be faulted for being too loyal but he was steadfast in subordinating the artillery to the other arms.³³

After failure at Aubers Ridge the whole method of bombardment was altered, yet the purpose - destruction - was not. One pressure was the shell shortage which led GHQ to drop intense bombardments, which led to 'hurry and inaccuracy and consequent waste of ammunition. ... We must base our plans on careful, methodical and accurate fire, aimed at producing the desired result with the minimum of ammunition'.³⁴ That this apparent sea-change in the nature of bombardments was made so quickly - two days after Aubers Ridge- and without

²⁸ WO95 155, 10/5/15.

²⁹ GHQ OAM217, 11/5/15, WO95/155.

³⁰ diary 10 5/15, 17 5/15.

³¹ diary 6/6/15, original emphasis.

³² 'Secret Memorandum' from 1st Army, 18/9 15, WO95 728.

³³ diary, 6/6/15.

³⁴ GHQ OA290, 27 5/15, WO158/17.

debate only emphasises that the short bombardment á la Neuve Chapelle was the aberration rather than the rule and that the bombardment's purpose was unchanged. While not recognising the distinction, the BEF was asking the artillery to destroy instead of neutralise. Neutralisation had never been the purpose and was merely a happy by-product at Neuve Chapelle; when neutralisation failed, the natural response was to apply more guns and shells, re-emphasising destruction. Not until November 1917 would neutralisation be the artillery's sole task, but until the definite development of the creeping barrage the artillery was primarily focused on destroying German positions and obstacles.

So the BEF continued to seek destruction. Robertson had already written Haig recommending 'deliberate, observed, and controlled fire, so that every shot may be definitely directed on the objectionable places' and that is what developed.³⁵ In the next battle (Festubert) there was a 60-hour preliminary bombardment³⁶ for blasting German defences; demoralising the defenders would be a by-product. Given enough weight of shell to actually destroy their defences, German morale should have declined, but shell was lacking in 1915. There was only minimal initial success at Festubert and GHQ repeated its criticism,³⁷ but the battle dragged on for a fortnight of small attacks with large casualty lists. Only days after Festubert was wound up, planning for a minor attack near Givenchy began, based on 'deliberate bombardment of the most accurate nature possible, and extending over several days, to ensure that the enemy's obstacles are destroyed and that his troops are seriously demoralised'.³⁸ First Army submitted ammunition estimates they cheerily admitted were unreliable, but were based on available experience; the estimates also fluctuated depending what was likely to be available, since all official directions considered it more important to attack than attacks actually be properly prepared.³⁹ Gains were minimal and at the end GHQ noted 'Ammunition is the governing factor in the operations and it must be recognized as such'.⁴⁰ Given the BEF's track record in 1915, this true statement was not likely to interfere with operations.

³⁵ letter, 12/5 15, WO95/155.

³⁶ stretched from the intended 36 hours due to bad weather

³⁷ eg WO95 155, 16 5 15.

³⁸ 1/6/15, WO95/155.

³⁹ WO95 154 & 155, 1- 6/6/15.

⁴⁰ OAM424, 19 6/15, WO95/156.

The next significant British attack was the battle of Loos, in late September 1915. Following the new pattern, the bombardment lasted four days so that all fire could be deliberate and no shell wasted. Emphasising the continuity in artillery thinking in 1915, when First Army issued 'General Principles for the Attack' in September, it was little more than a re-print of April's edition.⁴¹ Field artillery was co-opted into a bombardment that would otherwise have been even less adequate. The largest British attack to date, it was supported by the largest number of guns, which renewed command problems. Guns were parcelled out to the divisions so they might be responsible for all aspects of their attack. Mostly a product of the mania that a GOC had complete responsibility within his division, it meant the infantry laid down requirements without considering artillery problems or canvassing for ideas, and complained if anything less than perfection was the result. Holding firm to their tradition of supporting however they were asked, artillery officers did not complain until after the battle, when the defective system was changed, although their attitude did not.

With few guns and a large front, the shells were spread thin: there were only two rounds of 4.5" and one heavy howitzer shell per yard of German trench, assuming they hit.⁴² The weight of shell was inadequate and the Germans had also improved their defences again, adding successive lines of trenches. Some allowance was made for this, but not all plans were reconciled. Haig thought it was only necessary 'to destroy the hostile front trenches or parapets where they form a physical obstacle to the infantry advance' but also wanted German observations posts, command posts, communications trenches and roads shelled.⁴³ All this was necessary but, given the paucity of materiel, impossible. First Army attacked covered by smoke and gas intended to neutralise the defenders, although gas was also to compensate for the incomplete destruction from too few heavy howitzers. The whole artillery plan was a muddle, based more on the necessity of attacking than on adequate material or clear thinking. Haig himself spent more time considering how the gas and smoke should be used than going into details about the artillery; perhaps he felt he knew enough about artillery planning.⁴⁴ He did make some interventions in the planning, specifically urging the use of 18pr HE, which some subordinates thought was inadequate.⁴⁵ In any case the German position was not 'thoroughly prepared'. The battle's results were mixed but there was great dis-satisfaction

⁴¹ WO95 155 (13 4/15) & WO95 158 (6 9 15).

⁴² Rawlins Papers, Third Army RAHQ letter, 4/4/18. This was less than fired at against weaker defences at Neuve Chapelle.

⁴³ WO95/157, 23&24/8/15.

⁴⁴ diary, volume 5.

⁴⁵ WO95/728.

with the artillery results. Several problems were seen, including poor organisation but also lack of guns and shells. Haig blamed both and thought gas and smoke were adequate substitutes until more artillery was available, not noticing he wanted different things from each.⁴⁶

Throughout 1915 there was a tendency in the BEF to look for an artillery formula, a magic solution (expressed in guns and shells) that would end trench warfare. As mentioned above, a number of careful tests were performed to learn the wire-cutting ability of field guns. There was no comparable way to determine the number of shells necessary to demolish a German trench, since the Allies could not be sure until having captured a position how strong it was. Further, it is impossible to determine the morale effect of shelling. This led to debate about whether short, intense bombardment or prolonged shelling was more debilitating, a question that was never resolved but rather shelved in 1917. The artillery formulae deduced in 1915 varied depending on when in the year (battle experience changed expectations), who was forecasting, and the sector of the front (since German defences varied). The distinguishing feature of the formulae and forecasts⁴⁷ was that none were observed. While paying extensive lip-service to the primacy of artillery in the new conditions of trench warfare, British attacks still regularly took place without adequate artillery preparation. Trained since Sandhurst and Woolwich to consider offence more important than defence, generals simply attacked with what they could assemble. For one attack Birch, Haig's pet gunner, came up with his requirements but had to revise them downwards twice until they approximated what was available.⁴⁸ Rawlinson, who was to command the attack, heard from Haig that

GHQ say, if we can't do the job with less shells they will transfer the active duties to the II Army who can do it with a less expenditure. I [Haig] am quite sure they cannot but it is a bad policy to start the competition between the two Armies cutting us down in ammunition like this only increases the number of casualties and seriously endangers the success of the enterprise. It is a great mistake for which Sir John is alone responsible.⁴⁹

⁴⁶ diary, 8&18/10 15.

⁴⁷ there are far too many for even a reasonably comprehensive list, but see WO95/155 1/6/15; WO95/156 6 6/15, 30/7 15; Haig Diary 1/3/15, 8/8/15; Sir Richard Butler papers, IWM, memo c29 6/15; WO95 160 2&9/11/15. An interesting comparison can be made between WO95/268, 16/2/15 and WO158/18, 12/10/15, both attacks on Messines Ridge.

⁴⁸ WO95/156 4-6/6/15, Haig Diary 6/6/15.

⁴⁹ Rawlinson Diary, 7 6/15.

Yet the next day Rawlinson forgot his concerns and remarked he had 'a lot of howitzers' and later thought the attack was bound to succeed since it followed two days' bombardment.⁵⁰

This points to the mis-use of formulae: too often in 1915 it was assumed that if a successful formula was repeated, maybe scaled-up for a wider attack, success must follow. Furthermore, as proved at Aubers Ridge, the Germans might change the equation. Thus looking for an artillery formula was like hunting the Holy Grail. It was also a curious departure for the British army. Since the British army had evolved a firm belief that warfare was morale-centred, depending on the quality of men and officers rather than on bookish skill, why were they now desperately looking for quantities and formulae? In a way it was so they could return to leadership: if a formula were discovered, they need never worry about artillery again. What was more, their successful formula would have automatically ended trench warfare and the fighting would have returned to a 'normal' state. It is harder to say why British generals ignored the Germans' ability to improve their defences or tactics, something not true later in the war. The view that trench warfare was a temporary aberration could not encourage devising special methods. Perhaps they had supped too deep of the idea that defence was passive, or perhaps they were too absorbed in their own problems to see ahead. It was not a view restricted to infantrymen or cavalrymen, so it was not simply a matter of un-technical officers avoiding hard thinking on artillery.

The artillery too had not done all the thinking it might, instead sticking to its traditional role of supporting others. Artillery officers did take part in planning attacks, but they accorded other arms priority: almost never was something done solely to suit the artillery. Some of the first artillery pamphlets were an explanation for the infantry as to why some shells might fall short, why it might be necessary for the infantry to withdraw from the foremost trench. Gunners might do their utmost but there were some things that were physically impossible. Bombardments without enough shells were just as impossible as perfect accuracy.

Through all the battles of 1915 the C-in-C of the BEF, Sir John French, took largely a supervisory interest. He paid even less attention to artillery matters, focussing his attention on the shell (and gun) shortage. Sir John did not quite grasp the nature of the artillery planning at Neuve Chapelle, and, properly, thought neutralisation the artillery's purpose.⁵¹ French did little more than follow conventional wisdom about artillery, thinking a bombardment necessary

⁵⁰ Rawlinson Diary, 8&17 6 15.

⁵¹ French to WO, 27/3 15, WO32/5152.

and supporting heavier - and explicitly destructive - bombardments later in the year.⁵² French was gravely concerned about the excessively wasteful attack at Aubers Ridge, intervening in Haig's handling of the battle and afterwards pondering 'whether we ought not but to stand altogether on the defensive til an adequate supply of HE is available'.⁵³ He noted the concerns of General du Cane, the GHQ Artillery Adviser whom he thought very able, but took few steps to implement any suggestions.⁵⁴ On the whole, French was a hands-off C-in-C, not technically minded, who only acted slowly on any suggestions from subordinates. The shortage of guns and shells could not be ignored, but he had few ideas about how to use artillery when it was available.

While not getting much direction from above, GHQ produced a series of information and training booklets. These started in December 1914 and a total of about 90 were produced in the next year, few dealing with artillery. Some were produced for home consumption rather than for the BEF, since more troops were at home training than in France, and they needed up-to-date information.⁵⁵ Others were produced to teach everybody how to deal with new circumstances and new technology; sometimes these only appeared months after the arrival of the new kit.⁵⁶ There was no comprehensive series dealing with the various facets of artillery operations, nor was any 'artillery doctrine' laid down. The BEF did not particularly borrow French artillery thought, although periodically some gunners measured British methods against French ones. For instance in June 1915 the French were starting down the road to their 'artillery conquers, infantry occupies' doctrine but the BEF did not publish the relevant pamphlet until November; more detailed British ideas had been published in July.⁵⁷

When French methods were examined it was to compare them with British methods, to see if the British were using enough shells; senior gunners were not looking for a new artillery paradigm.⁵⁸ Rather, they were still content to be subordinate to the infantry in planning

⁵² Diary, 28/2/15, 9&13/5/15, 15/6/15.

⁵³ Diary, 12/5/15.

⁵⁴ diary 13, 19, 22/5/15, 22/8/15, 4&6/10/15; French to WO, WO32/5152.

⁵⁵ eg the 'Notes from the Front' series. Semi-official notes circulated as well, for example those sent to West Riding Division in G Helps Papers, IWM.

⁵⁶ eg CDS49, 54, 92, 93, 82, IWM.

⁵⁷ CDS24 (11/15), CDS50 (31/7/15)

⁵⁸ French to WO, 31/12/14, WO32/5152, French Diary, 13/5/15, 'note on ammunition requirements for a bombardment', 2/10 15, WO158 17.



matters, whether the battle was planned as a breakthrough or to draw off German reserves. Strategy was allowed to drive tactics; infantry tactics dominated over artillery tactics. However higher commanders launched battles knowing preparations were inadequate but there were overriding reasons to go ahead; artillerymen were willing subordinates.

Over the winter of 1915-1916 the BEF was preparing for a great offensive, one that would finally win the war. Forces available were larger than ever but the question was how large an attack could be made. There were not enough guns to attack everywhere and it had to be settled how many guns were necessary to support an attack of a given width. In mid-December the Loos ratio of c100yds per heavy piece was used as a planning basis, although it had been acknowledged as inadequate before Loos.⁵⁹ Smoke and gas were to supplement, but at Loos these had proven terribly fickle. By late January GHQ thought c75yds per piece adequate and that when more guns were available the front of attack should be widened rather than gun density increased.⁶⁰ While a decisive offensive was intended, it would not differ greatly from any preliminary attacks. Artillery ratios hardly differed between types of attack, and both First and Third Armies put forward plans for limited attacks that had ratios of 70-75yds per piece.⁶¹ This was broken down as 100yds per heavy howitzer⁶² with other heavy guns in proportion lowering the overall figure. 75yds per heavy was already a considerable dilution in Haig's thoughts: before Loos he addressed the possibilities of both general offensives (25 miles of front) and small ones (3,000yds).⁶³ In both instances he advocated a ratio of c40yds per piece, 88% denser than he accepted in 1916. It is also considerably higher than that at Loos, but the problems there had not led Haig towards heavier shelling.

When attacking a strong position like Vimy Ridge or Messines Ridge a higher gun density would be needed, but only for a Verdun-style attack with artillery conquering, infantry occupying.⁶⁴ This suggests there were in fact three categories of attack: decisive, preliminary

⁵⁹ WO158/18, 14/12/15.

⁶⁰ WO158/19, 22&18/1/16. 1916 experience led to a general standard of 25yds per gun for 1917. Second Army set an 'ideal' of 25-30yds per gun in 9/1915, but there were insufficient heavies for any sizeable attack. Sir John Headlam Papers, RAI Military Document 183 (hereafter Headlam Papers), part 2 11 9/15.

⁶¹ WO158 19, 29 1 16, 21 2 16.

⁶² At this point 6" through 9.2" were called heavy; later only 8" and 9.2" qualified. In 1916 considering only 8" and 9.2" as heavy would have roughly halved the number of 'heavies'.

⁶³ diary, 29 6/15, 8/8/15.

⁶⁴ WO158/19, 25/5 16; WO158/18, 12/10 15.

and limited, the last only intended to seize a specific bit of ground at a minimum cost in lives, and was the closest to bite-and-hold. However, the 'limited' methods had already been rejected for use in the decisive offensive, and were not even fit for preliminary offensives, only local attacks.⁶⁵ First Army contemplated its experiences at Neuve Chapelle, Festubert and Loos and derived a formula that told how many guns and shells a Corps would need to take a 1,000yd-deep bite from German defences.⁶⁶ Paradoxically Festubert had seen the greatest shell density but the worst results: the formula called for 82 heavy pieces, about one per 30yds of front. Deducing a formula is a worthy procedure if the results are taken with a pinch of salt, but there was still a tendency at this point to seize upon a neat mathematical formula and expect success regardless of what the Germans did.

The background to the 1 July attack has drawn many authors' attention.⁶⁷ This dissertation will not attempt an exhaustive re-examination, but some points in the argument between GHQ and Fourth Army (really between Haig and Rawlinson) should be emphasised. It must be admitted Haig vacillated during the planning, but this was more about whether the offensive was decisive or part of the wearing-out struggle. As shown above, this made no difference for artillery planning. Rawlinson preferred taking a chunk out of the German front line and had to deal with the detailed tactical problems that Haig tended to gloss over.⁶⁸ Clearly the depth of advance planned made a huge difference to the density of shell-fire: advancing 2000yds instead of 1000 would halve the density, as the number of guns and shells was limited. Their main point of argument purely regarding artillery was the length of the bombardment. Haig preferred a short bombardment, hoping for surprise and to rush through the successive German lines but simply assuming German defences would be battered as well as defenders' morale. Rawlinson originally had no preference about bombardment length, saying both were demoralising. Both men were assuming the artillery problem of opening holes through the defences had been solved and moving on to the second-order problem of the German infantry. As Rawlinson spent more time examining the problem, he converted to a long bombardment, citing two reasons Haig could not gainsay. Whatever form of bombardment was chosen, wire-

⁶⁵ WO158/19, 16 1 1916. This is within a month of Haig replacing French.

⁶⁶ WO158/259, no date but c22/1/16.

⁶⁷ Probably the best operational analysis is Robin Prior and Trevor Wilson, Command on the Western Front: The Military Career of Sir Henry Rawlinson 1914-18, (Oxford: Oxford University Press, 1992), hereafter Prior and Wilson, Command on the Western Front.

⁶⁸ Although at one point Haig noted 'I think such a plan [rushing the whole German defences at once] would be impracticable against this position'. WO158/223; note on GHQ's copy of GX3 1 of 3 4/16. Conversely, Haig had no comments to make about the bombardment.

cutting would take several days and thus negate surprise; secondly the French (attacking on the British right) intended a long bombardment, also voiding any surprise element. Rawlinson also reiterated the arguments that a long bombardment weakened morale more than a short one, maybe playing to Haig's obsession with German morale.⁶⁹ In this Rawlinson seems strongly influenced by reports from Verdun:

Results have proved that the defenders though subjected to this very heavy fire were able at the moment of assault to man the remnants of their trenches and bring the enemy to a standstill. All that artillery can definitely accomplish is a diminution of the material means of defence and wear and tear of its moral; it cannot ensure their destruction.⁷⁰

Rawlinson's sound reasons won GHQ's grudging support and for a few weeks Haig talked about only advancing as far as the artillery could prepare the way.⁷¹ However, as usually happened, Haig's confidence rose with the approach of the offensive and only four days before the bombardment was to start GHQ resumed meddling.⁷² The idea was to save shells and not fatigue gunners, so that the expected success could be exploited quickly.⁷³ Rawlinson argued back with some of GHQ's own arguments but did trim the bombardment slightly.⁷⁴ Through all the various plans, Haig treated initial success as certain and devoted his attention to the later stages of the battle; Rawlinson had to ensure the initial success and was less confident of it than Haig. In this battle of the memos there seems very little input from the artillerymen. Haig does not mention discussions, but Rawlinson sometimes talked matters over with his Chief of Staff, who happened to be a gunner, as well as with Noel Birch, nominally the artillery adviser.⁷⁵ In the midst of the planning Birch was elevated from MGRA at Fourth Army to MGRA at GHQ, but made no difference to the debate. That the gunners had so little input into planning serves as a silent reminder that they saw themselves as subordinate, if executive officers, who worked within the plans devised by others.

⁶⁹ Fourth Army Operations Papers, IWM, v5, letter 10 (hereafter thus: Fourth Army Papers v5 L10). Rawlinson watched German morale, but was not as fixated upon it as Haig.

⁷⁰ Field-Marshal Baron Rawlinson of Trent Papers, National Army Museum 5201-33-68 (hereafter Rawlinson Papers), Joffre's report on the Verdun attack of 13/4/16 with Rawlinson's marks in the margin.

⁷¹ Haig Diary, 15 6/16.

⁷² Haig diary, 18, 27, 29, 30 6/16. Rawlinson's confidence also rose: diary, 29 6/16.

⁷³ Fourth Army papers, v5, L38.

⁷⁴ *Ibid.*, v5, L39. The reduction in the bombardment did not affect the results, since the bombardment was also prolonged two days due to weather.

⁷⁵ Rawlinson Diary, 4/3 16, 15/4/16, 1/6/16.

Throughout the planning of the Somme offensive higher command believed they had adequate artillery for the front involved. Haig's diary reveals few concerns about the quantity of artillery and ammunition.⁷⁶ In 1916 preliminary attacks to draw German reserves had to be rejected because there were not enough guns to cover both main attack and preliminaries; a 20,000yd-wide main offensive was sacrosanct until after 1 July.⁷⁷ One gun per 75yds was enough to clear the way for the infantry and infantry/cavalry impetus was the deciding factor between limited and decisive attacks. Certainly the Somme offensive was not intended to mimic the Germans at Verdun, with artillery replacing infantry as the assault arm. Such attacks might have their place in British strategy but they were not thought of as war-winners. As far as GHQ was concerned the Somme offensive was more than adequately provided for,⁷⁸ and the German trenches and wire should prove no significant obstacle. This was the implicit purpose of the bombardment, although there were certainly features designed to kill as many Germans as possible, and the planning stuck closely to destroying obstacles.⁷⁹ GHQ never made Rawlinson's rash promises of annihilation of the Germans in the bombarded area, which suggests more realism than GHQ is sometimes credited with. However, they did apparently believe that the German defences would be entirely swept away so that the British numerical superiority in infantry would be decisive: the order of the day on the eve of the offensive pointed out the Germans only had 32 infantry battalions (with 65 in reserve) in the area attacked by 13 British divisions.⁸⁰ Rawlinson wrote glibly of 'destroying' and 'pulverising' the entire German front line and the fortified villages, and 'beating down' defences.⁸¹ GHQ official doctrine approached French ideas, thinking artillery destruction of German positions was the first priority.⁸² Written in April 1916 and issued in May and June, SS98/4 'Artillery in Offensive Operations' was the BEF's artillery textbook, so important extracts are quoted.

⁷⁶ vols. 8-10.

⁷⁷ WO158/18, 14/12/1915.

⁷⁸ All Corps involved had considerably more than one heavy per 75yds, as much as one per 40yds.

⁷⁹ eg OAD876 (16/5/16): The bombardment should be 'continued until the Officers Commanding the attacking units are satisfied that the obstacles to their advance have been adequately destroyed'. WO158/223.

⁸⁰ OAD17, 21 6/16.

⁸¹ Fourth Army Papers, v5, 1 6&10. It is not clear whether Rawlinson saw Joffre's report before or after his 19 4/16 letter.

⁸² SS98/4, 'Artillery in Offensive Operations', 4/16.

Under present conditions, no offensive operation can be expected to achieve complete success unless both the preparation and support by the artillery are effective ... The first and most essential element of success is that the front selected for attack should admit of a full development of artillery fire, and of complete co-operation between the artillery and the infantry. ...

The preliminary bombardment is designed to achieve a certain purpose, namely, to enable the infantry to enter and penetrate the enemy's position: for this his works and the obstacles protecting them must be adequately destroyed, and his morale shaken. The extent of the ground to be bombarded will ... in all cases include, in addition to the destruction of the enemy's front-line system on the front to be assaulted, the next line in rear, and all communication trenches leading from it towards the front line.

21. Duration of the bombardment. Shortening the period may give the advantage of surprise, and may prevent the enemy bringing up more artillery to meet the attack. On the other hand, it will entail a much heavier expenditure of ammunition of the heavier natures, and a short bombardment, however intense, may not have the same effect on the enemy's morale as the protracted strain of some days' exposure to constant shell fire, particularly if during this period his communications are adequately blocked. Judging from the duration of the preliminary bombardments in the most important offensive operations of the past year it cannot be said that the high road to success lies either in a short "hurricane" attack or in a protracted bombardment. The duration and character of the bombardment must primarily depend on the strength of the enemy's works, and the artillery available for the attack, but many other factors must be considered by the general officer commanding the force, with whom the decision must rest. It is the duty of the artillery commander to place before him the technical considerations involved. ... In some cases an attack must be launched at a pre-arranged time, whatever the cost, and the responsibility of the artillery commander is then limited to doing his best to have the preparation as complete as possible by that time. But when this is not the case, it is the duty of the artillery commander to inform the general officer commanding if he considers the attack should be deferred in order to allow of further artillery preparation. The completeness of such preparation must, however, always be a relative term, and many considerations other than the purely artillery one must influence the decision.⁸³

The pamphlet concluded with suggestions on how much ammunition to allow for this destruction. French and German rules-of-thumb were quoted but the numbers recommended were British ones, the lessons from Loos repeated. But this varied from (Haig's) First Army conclusions about Loos, that their ammunition allotment 'did not allow of a thorough bombardment'.⁸⁴ Why there was such a change in opinion in the next few months is unclear.

⁸³ It should not be thought that the last comments were forced upon the artillerymen by the General Staff of formation commanders; drafts of the pamphlet exist in the Headlam Papers, RAI.

⁸⁴ Advanced First Army 'Some Artillery Lessons to be learnt from the Recent Operations in September-October 1915', 7 11 15, Rawlinson Papers, NAM.

There seems to be a mental gap in the General Staff regarding artillery. On paper the BEF recognised that 'guns formed the "iron framework of battle"' but all the caveats meant anything else would take priority. The requirement was not for a certain number of guns or shells but for adequate results against German defences.⁸⁵ For planning it was simpler to calculate numbers of shells and assume these would do the business, but this ignored what the Germans were doing.⁸⁶ Not until the pious phrases about infantry-artillery co-operation became reality, rather than the artillery being the infantry's adjunct, would the situation improve. This really means a change in the infantry: the artillery hardly wavered in doing what others thought best, not what best suited themselves.

One question where GHQ and Fourth Army eventually agreed was wire-cutting. It was obvious that the German wire had to be cut for the British infantry to succeed. Experiments were still being conducted with new fuzes and methods; eventually general procedures evolved.⁸⁷ The results were circulated to the army as soon as they were available, rush editions even being printed in the last few days before the Somme bombardment opened.⁸⁸ As an aid to planners, norms were given of how many shells were required to cut a given amount of wire; these were revised in the June edition, experience showing them too high. Throughout 1916 wire-cutting was a difficult operation, requiring considerable time and skill. Also with the Germans using much greater depth in their defences it was more important to cut distant wire, an even more difficult target. Getting shells close was not enough, they had to be on target. This would change with the availability of the 106 fuze, which meant HE could be used instead of shrapnel and wire-cutting no longer depended on 18prs. However, despite official adoption into service in July 1916 quantities of 106 fuze only arrived in time for the Arras bombardment of April 1917. Lacking an easy way to cut wire, the only alternative was to bombard deliberately, accepting the slow-down. In the original bombardment plan for the Somme wire was to be cut every day for five days. Poor weather caused the bombardment to

⁸⁵ In some cases it was realised adequate results could not be guaranteed: III Corps did not have time or shells to re-bombard a section of German trench not sufficiently prepared by the first shelling. V Corps BGRA diary (WO95/756) 'Report on visit to III Corps', nd but pre-Somme. (hereafter V Corps, 'visit to III Corps')

⁸⁶ A detailed example of artillery planning, especially interesting for arguments between RA and GOC, before the Somme offensive is X Corps BGRA diary (WO95/862) from 4/1916.

⁸⁷ Hussey Diary, 30/10/15; Haig Diary 17 1/16; Headlam Papers, pt2, 18/10/15, 1& 25/11/15, 9/12/15. Hussey noted the presence of most Gunner generals in the BEF at one test.

⁸⁸ CDS93 ('Report on Experimental Firing ... at Calais') 11/15; SS98/5 ('Artillery Notes: Wire Cutting') 2/16 and 6/16.

be stretched to seven days; regardless, the wire was adequately cut.⁸⁹ Some units realised the German wire could not all be swept away, but only gaps cut. III Corps lacked time and shells and concluded 'It is therefore for the infantry to state what wire can be left [un-cut]'.⁹⁰ This serves as yet another reminder that artillery planning was subordinated to the infantry, for it was the infantry who wanted all the wire swept away - it suited their tactics - when it put severe strain on guns. Fourth Army's artillery files show the trouble, yet the artillery never asked for a change of plan.

GHQ still had to worry about ammunition supply. Although the shell shortage was past its nadir there was still no great surplus and economy was desirable. Shortly after Loos the question of short vs. long bombardments was again examined with a view to economy, this time contrasting British with captured German figures.⁹¹ The Germans relied upon short, intense bombardments and used two-thirds as many shells as the British, but the BEF did not modify its artillery policy in response. Instead they overlaid British assumptions about destruction onto German data which was concerned with neutralisation. Now the British had more guns and shells, they questioned whether surprise combined with weight of fire might save ammunition. Not realising the German intentions, the British fell between two stools: they thought intense bombardments might be more effective at destroying defences (not true) but thought of short bombardments being spread over several days (thus wasting surprise). Concern over ammunition stocks persisted throughout the Somme campaign and as early as 2 July Haig told Rawlinson that manpower was not a problem but shell supply was.⁹²

It is not the intention here to chart the daily events of the battle of the Somme. Nonetheless some episodes are worth examination. Guns were concentrated and never again was there an attack on as wide a front as 1 July. Thus bombardment density, on the whole, rose and also tended to rise throughout the offensive.⁹³ Bidwell and Graham, in Firepower, point to a

⁸⁹ The OH mentioned only three places where wire offered any obstacle in the front line. The real problem was the Germans were still strong, something patrol results showed but intelligence that was ignored.

⁹⁰ V Corps, 'visit to III Corps'.

⁹¹ WO158/17, 19/12/15.

⁹² Fourth Army Papers, v5, conference of Haig, Kiggell, Rawlinson and Montgomery 2/7/16. Guns never ran out of ammunition unless from tactical delivery problems, but sometimes shell supply was low. XIV Corps BGRA diary (WO95/915) 11/7/16.

⁹³ In August XIV Corps used one heavy (8" or 9.2") shell per yard of trench, or two 6" shells. By September, Reserve Army laid down four 4.5" or 2.5 6" or 1.5 heavy shells per yard. By October Canadian Corps had pared this back to the August levels, but also were willing some times simply to blast German trenches: 'The

memorandum from Birch about this concentration of artillery, quoting it with approval.⁹⁴ Birch wrote that, had artillerymen only been consulted, the guns would have been more concentrated from the beginning, ensuring the German trenches were destroyed. Yet he went on to say, and this was not made clear in Firepower, 'Presuming that this view had been accepted and that the German defences had been totally demolished ... I do not consider that we should have been in a better position today, in fact not so good'.⁹⁵ Birch was doing what other senior artillerymen did, looking beyond a parochial artillery viewpoint, considering matters as they affected the infantry and subordinating himself to that wider view.

Regardless, the concentration of artillery took place and was greatly helped because there were fewer attempts to break through. Yet as Prior and Wilson demonstrate,⁹⁶ the concentrated artillery to which Birch was opposed did little good on its own, for often the Germans could themselves concentrate just as much as the British could. With more trench-to-trench fighting, the depth of the objective was seldom more than 2000yds.⁹⁷ Often attacks were made as soon as the infantry were ready but before the artillery had adequate time to knock around German defences. Yet the artillery did what they could, and the inadequate preparation was because of pressure from the General Staff and formation commanders. BEF doctrine paid lip-service to combined arms action, but more commonly meant whatever the other arms could do to support the infantry, not equality between the arms. Gunners had to do the best they could in the time allotted, and attacks were more often postponed because of weather than to await better artillery preparation. Through the battle, simple blasting of trenches dwindled as a part of the artillery's duties. Aerial spotting developed rapidly, improving bombardment accuracy, but also greatly facilitating counter-battery work. CB work became more important largely because British artillery was now, finally, strong enough to blast the Germans out of any given trench, so the Germans changed their defensive tactics. The creeping barrage also developed rapidly, and attention centred on these newer elements of artillery work. Responsive British changes were gradual, fixing problems and improving on success. Commanders were too busy during the fighting to do much more, and extensive changes had to wait until a lull in the fighting.

above sections of trench will be destroyed by deliberate shooting ... No limit to number of rounds fired on each spot, except that each section of trench must be completely obliterated'. XIV Corps BGRA diary (WO95/915), 16/8/16; Canadian Corps RA diary (WO95/1059), 12/9 16, 4&10 10 16.

⁹⁴ Firepower, p100 n102.

⁹⁵ memo, Birch to Kiggell, 9/7/16, Rawlins Papers f12a.

⁹⁶ Command on the Western Front, chapter 20, pp203-26.

⁹⁷ Some attacks were simply taking one enemy trench, and the Army Commander would intervene to the extent of ordering the registration of specific points. III Corps BGRA diary (WO95/690), 3/8/16.

In retrospect the bombardments of 1914 through 1916 look amateurish. At the time, most were on the cutting-edge of technique and technology. It is critical in reviewing bombardments of much of this period to remember that German defences were less sturdy than later in the war. While British bombardments of 1915 were lighter than in 1917, they had less work to do. There was less barbed wire, fewer trenches and no pill-boxes. There were still too many instances of inadequate bombardments, for two reasons. First it was sometimes politically imperative to attack, usually because of French pressure on the British to do their share. Second, there were times when the generals simply got it wrong. Lacking any experience of war under present conditions, they had to improvise until experience was bought. There were still errors of judgement, usually far too much optimism about the chances of repeating the successes while correcting the failures of previous operations, while expecting the Germans to sit still. Lacking any idea when the war was going to end, and hoping for decisive victory rather than merely to exhaust the Germans, the constant goal was a break-through. Desirable at all levels, it proved to be tactically impossible. Artillerymen consciously held themselves subordinate to the combat arms and did what they could to help, not always what was best.

Preparing the Attack

Part II: 1917-1918

In the winter of 1916-17 the BEF digested the experience of the Somme. Two Armies, nine Corps and forty-nine Divisions¹ had participated in the fighting, compared with the single biggest battle of 1915 engaging one Army, three Corps and nine divisions. What is impressive, given the reputation of Great War generals for obstinacy, is the eager seeking after lessons. Very shortly after the offensive ended, both Armies compiled reports of 'lessons learned' with an eye, not to repeating the old ways, but of improving standards across the whole BEF.² This was aided by a new batch of SS pamphlets. Unsurprisingly some pamphlets only needed updating, some were completely revised, and there were whole new topics to be covered.³ However, while details were updated and new wrinkles added, the purpose of the bombardment - the obliteration of German defences - was unchallenged, but now new areas were covered.

Again the relevant manual, SS139/4, 'Artillery in Offensive Operations' will be quoted.

The rupture of the enemy's front ... entails the destruction of the obstacles to the infantry's advance and of the means of defence that support those obstacles; the moral and physical reduction of the defenders; and lastly a rapid and combined advance of all arms acting in close co-operation. ... Experience has proved that effective artillery preparation is indispensable to success ... Granted the vital importance of effective artillery action in the offensive, it follows that the general plan of attack must be such as to admit of a full development of artillery fire and of complete co-operation between the artillery and the infantry. ... For this it is not enough that the requirements in guns and ammunition should have been carefully estimated and adequately provided. The first and most essential element of success is that the front selected for attack should be of a nature to admit of this full development and co-operation. ... It is, then, the first duty of the artillery commander to place before the general officer commanding the force full particulars as to the manner in which the ground affects the efficiency of the artillery preparation and support, so that the latter may give due weight to such considerations in selecting the front of attack. ...

1. Object of the Preliminary Bombardment

¹ counting only those formations that spent over two weeks in the line

² Fourth Army 'Artillery Lessons Drawn from the Battle of the Somme', Montgomery-Massingberd Papers, f48; Fifth Army WO158/344.

³ eg SS114 'Care of Guns During Prolonged Bombardment', (3/17), SS131 on RFC-RA co-operation (12/16), SS552 on Sound Ranging (3 17).

The task of the Artillery in an offensive battle is to prepare the way for the infantry and to support and protect the infantry throughout its progress. The preparation of the way is achieved by the preliminary bombardment which aims at-

(a) the overpowering of the hostile artillery;

(b) the physical and moral reduction of the enemy's infantry;

(c) the destruction of material obstacles to the advance of the attacking infantry and of other defences. ... The artillery's task being to open the way for the infantry, its fire must be directed towards breaking down, firstly, the enemy's material powers of resistance, and secondly his means of directing his defence, incidentally thus increasing his demoralisation by causing casualties and inducing confusion. ... If the attack is to go through to as great a depth as possible, and if time allows, then certain points in the enemy's second line should be selected for destruction on the same principles as govern the artillery attack on the front system of defence. If, on the other hand, the attack has a limited objective, or if the attack of successive objectives spread over several days is contemplated, then there can be but little value in any extensive bombardment of the second line. ... But the first essential is to ensure the infantry's passage over the enemy's front line system of defence, and to take in chances in this respect in favour of more distant systems is manifestly indefensible.

Contrasted with the previous year's edition, there is a more even balance between artillery and infantry; reflecting its combined-arms nature, many sections were quoted straight from the infantry training pamphlet.⁴ Missing was the ominous comment about attacks going ahead with manifestly insufficient support, although just because it was not written down did not mean the infantry were not sacrificed from time to time. There were also sections about improving liaison so the infantry would not feel neglected. It was not from spite that the artillery were neglecting the infantry, but the nature of fighting had changed and there was far more work for the artillery to do that the infantry did not appreciate because it was not visible from the trenches. Counter-battery work and all the targets behind the German front line were more important than ever thanks to the new German defensive tactics.⁵ This was a tribute to the Royal Artillery's success in 1916: with enough guns and shells to bludgeon the German front line, they altered the tactics of the Western Front but did not end the war by merely changing tactics. It also reflects the far greater skill, experience and firepower of the infantry, that they were more comfortable with the artillery doing its work elsewhere on the battlefield. At this time CB fire became a higher priority than trench destruction, and it was to stay so throughout the remainder of the war. Greater firepower had also made barbed wire less important while preparing what would now be called the 'deep battle' was more so.⁶ Although

⁴ SS135 'Instructions for the Training of Divisions for Offensive Action', 12/16.

⁵ see G C Wynne If Germany Attacks: the Battle of Depth in the West (London, Faber & Faber, 1940).

⁶ While they would not now qualify as 'deep targets', they were relatively deep.

breaking into the German defences was now more likely, in the debate over bite-and-hold vs. breakthrough there was still no large chance of a breakthrough.

Perhaps the biggest change visible to the infantry was the declining importance of barbed wire. With new weapons and the new 106 fuze,⁷ wire-cutting became quicker despite the Germans vastly thickening their belts of barbed wire. Despite the diminished importance of the front line (even the front system of trenches), bombardments lengthened. Because there was no longer much doubt the front line would be taken, operations now revolved on whether the second or third line could be taken in the initial rush. Increasing the depth of objectives meant more targets and many would be out of range of most British guns, thus requiring a longer bombardment. In 1918 the proportion of heavy guns would be high enough to allow rapid saturation of deep targets but it was not possible in 1917. The Somme had been preceded by seven days bombardment (five planned); Arras had five days intense but preliminaries had started weeks in advance.

The general theme in the BEF at the beginning of 1917 was of improving on the previous year rather than of going down a new road. Bite-and-hold was not adopted as the main strategy, not least because it did not fit with Allied war aims. From time to time an attack with limited objectives was made, particularly to seize a key ridge like Vimy or Messines. Here there was little chance of the Germans counter-attacking once the BEF took the feature, and these battles were not really part of a wearing-out struggle, more semi-independent operations. In planning the first battle of the new year, there was a chance for new methods to be tried but it was rejected for a variety of reasons and evolution chosen over revolution.

The British share of the Allied offensive was first intended to be a resumption of the Somme offensive, but that idea was soon dropped and the task handed over to Third Army, around Arras. In late January at a conference of Army Commanders the GOC Third Army, Allenby, produced a plan for a surprise attack.⁸ He intended 48 hours of intense bombardment but the main emphasis was surprise.⁹ This plan was submitted before the Germans withdrew to the Hindenburg Line, shortening their line and economising troops which mostly went into

⁷ which allowed howitzers to cut wire reliably. This had two effects: one howitzer shell could cut all the wire in a 6yd radius as against an 18pr shell which could cut a cone perhaps 3yds wide and 10yds long. Howitzers could also cut wire on a reverse slope - the other side of the hill - something guns could not.

⁸ It was Allenby's own plan, only supported by his artillery adviser Arthur Holland: Field-Marshal Viscount Allenby of Megiddo Papers, 6/VII/7, LHC (hereafter Allenby Papers). At the conference three other army commanders expressed doubts about a short, heavy bombardment: Horne, Rawlinson and Gough. (WO158/223, OAD291/12, 27/1/17) However, Horne soon submitted his own offensive plan which embraced a short bombardment: WO158/40. Rawlinson had less to say, perhaps recalling his experiences the previous year. Plumer, who was not present, presented a plan for a short-bombardment attack three days later: WO158/38.

⁹ GS1 16A of 7 2/17 (WO158/223) and war diary (WO95/363) of the same date.

reserve, many opposite Arras. Allenby judged his attack, after a relatively short bombardment, would break through the thin German lines and that few reserves were available to fill holes. Allenby was also implicitly showing more faith in the British infantry, judging they could fight their way forward rather than just follow behind a barrage, very much in keeping with SS139/4. GHQ did not criticise Allenby's plan on these grounds; rather it objected to the new methods.¹⁰ Haig personally took his time pondering Allenby's methods - he reserved his comments at the conference - and leaned heavily upon Birch for analysis. In the first discussions with Allenby, Haig promptly called Birch in for support: many of Birch's pet topics formed the points for GHQ's queries.¹¹ Birch was showing less confidence in the infantry by suggesting that the bombardment should be heavy and the wire-cutting complete. When Haig did give his views, he only noted that Allenby's plan was 'bold'.¹²

Unfortunately for Birch, Holland had matters thoroughly researched and rebutted his points.¹³ GHQ was, traditionally, worried about morale and wire-cutting, but also thought Third Army wanted too much destruction and finally deprecated the possibility of surprise, apparently not noticing these were mutually exclusive.¹⁴ Third Army answered each of these points, but time was running short and GHQ had either to accept Third Army's plan or flatly over-rule it. Out-argued - there was only one hesitant '?' in the margin - GHQ used its authority and kicked Holland upstairs to command I Corps.¹⁵ In the grand tradition of British

¹⁰ These were not even terribly new: Third Army had already submitted a plan for an attack on Monchy-le-Preaux with the same elements, and GHQ replied Haig 'approved generally of your plan'; artillery was not the cause of any concern. SGR61/7, 28/12/16, OAD260 2/1/17; WO158/223.

¹¹ Haig Diary, 28/1/17. Haig's moderate comments were: 'He has certainly gone very carefully into all details, but I wish some of his calculations to be checked by GHQ'. Anstey's proofs for his History of the Regiment (p140) say Birch 'intervened and objected' on his own accord: EC Anstey Papers, RAI Military Document 1159 (henceforth Anstey proofs and Anstey Papers). Birch and CE Vickery to Edmonds, 22/11/7 & 14/2/38, CAB45/116. Oddly, in discussing the weight of the bombardment, as opposed to the method, GHQ used figures long out of date, from June 1916 and even Loos: letter, Birch to Holland, 4/2/17, Anstey Papers.

¹² OAD314

¹³ GS1/25 of 21/2/17 and OAD314 12/2/17, WO158/223. One of GHQ's complaints had been about wear of guns. Third Army had already done tests, the results of which were unveiled and issued as an update of SS114 'Notes on the Care of Guns During Prolonged Bombardment'. (3/17 and 6/16, which does not survive.) With unconscious irony Haig wrote to the War Office after the battle praising the performance of artillery equipment: WO95/58-60, GHQ Director of Ordnance Services diary, 2/5/17. Third Army had tested its plans to the extent of having VI Corps fire a 48hr test bombardment in early January and then have the infantry patrol the German line to see its effects, which were apparently satisfactory: VI Corps CHA diary.

¹⁴ Birch to Holland, 4/2/17, Anstey Papers.

¹⁵ WO158/223. This may have been a calculated double-snub: I Corps held a very quiet stretch of front, where Holland would have little activity. Holland was livid at GHQ's obstinacy, at one point storming around the office and offering to stand on a chair with his head in a noose in the Grand Place of Arras, the chair to be removed when the first German shell hit the city. Allenby Papers, 6/VII/7. In 1916 Haig had thought highly of Holland; kicking him upstairs was more of a warning to Allenby. Kiggell to Robertson, 4/6/16, General Sir Launcelot

army intrigues, seniority played a role for Holland was Birch's Regimental senior so Birch was simultaneously senior and junior to Holland.¹⁶ It should be noted that not only GHQ had doubts, and the argument was not simply Birch v. Allenby (with Haig and Holland as seconds): some of Allenby's subordinates, responsible for the actual attack, were unconvinced, as was the man actually drafted in to handle the planning.¹⁷

This is not the place to attempt a detailed counter-factual investigation of whether the Allenby/Holland plan would have worked.¹⁸ Some aspects of it were deeply flawed (eg traffic control in getting the cavalry through, which actually failed) and some were suspect (relying upon the Germans to make mistakes, which did happen) but it must be remembered these were not the grounds on which the plan was rejected. Haig and Birch over-ruled Allenby because he was not doing things the tried-and-trusted way. It is surprising that GHQ should have taken this line, preferring trench-warfare methods that had been anathema in 1915 to the more traditional ones that it always gave lip-service.

This in turn raises the question of Birch's influence over Haig, both in early 1917 and generally. SS139/4 had introduced a new scheme for artillery planning of attacks, with each Army's MGRA supposed to decide the basis of bombardment plans - consulting widely amongst the troops who would actually be involved - and then co-ordinate the detailed planning. However GHQ specifically noted that Armies were to work within 'the limitations imposed by the Commander-in-Chief'.¹⁹ Birch himself tended to lean to offering the infantry heavy support, as much as they wanted and was practical, writing to the Official Historian that he liked to offer the infantry complete wire-cutting.²⁰ If the infantry - after discussions - asked for more support than was ideal, then they had reasons and the artillery should do as asked while working to persuade the infantry for the next battle. In general, Birch had patchy influence with Haig. The two got on quite well personally, for in the dark days of early 1918, when there was little either man could do to influence the fighting, Haig selected Birch to motor

Kiggell Papers, I/7, LHC.

¹⁶ Birch to Edmonds, 22/11/37, CAB45/116 shows Birch's inhibitions about ordering Holland. According to King's Regulations (§ 224(iii) and 225) Birch was right: he was technically junior to Holland.

¹⁷ JRC Charles(?) said that the GOC of XVII Corps doubted Allenby's plan: letter to Edmonds c14/7/37, CAB45/116. Uniacke, inserted to do the detailed planning, was also against the short bombardment. OH1917v1, p179n1.

¹⁸ The present author considers Allenby's plan stood a reasonable chance, at least before the German withdrawal to the Hindenburg Line provided more German reserves. For the contrary view, stated perhaps more strongly than the evidence warrants, see Hughes, Jackson The Monstrous Anger of the Guns: The Development of British Artillery Tactics, 1914-1918 (University of Adelaide, PhD dissertation 1992).

¹⁹ SS139/4 §1 ¶3.

²⁰ Birch to Edmonds, 22/11/37, CAB45/116.

around the rear areas with him. However, although 'it was marvellous the way [Haig] did attend to me [Birch], and he was most interested in the artillery' yet Haig was entirely willing to over-rule the artillery: 'poor Haig - as he was always inclined to do - spread his guns'.²¹ It would always have been a struggle to persuade the man who drafted Field Service Regulations to re-think warfare, and Birch could not. His influence was fairly constant with Haig, and GHQ's decisions about various army plans seem to depend more on Haig's views of the army commander involved than upon artillery matters in the abstract. The relatively greater role Birch plays at Arras may well be because Haig was distracted by the Prime Minister's machinations at Boulougne.

After fighting each other, the BEF opened the battle of Arras against the Germans. Whether or not it was due to so much high-level interest or the improved command arrangements, the artillery did their work well. The bombardment was the best to date (even too heavy in places²²) and the barrages worked smoothly. As was ever the case in WWI, things did not work as well on succeeding days since movement and communications were difficult to organise. Novel elements like smoke barrages and the 106 fuze²³ worked extremely well but when the battle had to be continued as cover for the French collapse it degenerated into lurches forward or backwards. There was more to be learnt from the later fighting about barrages than bombardments, something which was studied in detail.

The next British attack took place on Messines Ridge, about a month after the fighting at Arras was allowed to die down. The pause was necessary to perfect the artillery arrangements, mainly moving north many of the guns used at Arras. There was enormous similarity in the planning and that at Vimy Ridge. Some of this was deliberate as proven methods and plans were passed along on informal networks as well as published via SS pamphlets; for instance Lieutenant Colonel AF Brooke passed on Canadian Corps' voluminous and detailed CB plans to X Corps who covered a flank.²⁴ Considerable preliminary work had already been done on more than just the famous mines: administrative and other plans had been in hand for over a year. The two Corps on this front had been in place for a very long time and knew their sector

²¹ Birch to Edmonds, 29 6/38; ditto, 8/7 30 both CAB45/132

²² Horne's complaint to Haig, Haig Diary 12/4/17. Horne's First Army had more closely followed Birch's ideas on destruction than had Third Army.

²³ Something First Army had depended on as a secret weapon; see Appendix 11 of the OH.

²⁴ HW Wynter, 'The Revival of the Barrage', *Journal of the Royal Artillery*, v70 no4 (1943), p273. SS 158 (Notes on Recent Operations...), 164 (Notes on the use of Tanks...), and 168 (Notes on the Employment of Serviceable Guns... captured...) were all published after Arras but in time for Messines.

thoroughly which gave great advantages to the RA. In a broader perspective, in both cases the seizure of the ridge was an end in itself and there was no intention of exploiting or continuing the battle until the Germans were worn down. These were independent operations rather than part of a plan to wear the Germans down in a few weeks.

Messines was also the first large attack for Second Army, which already had a reputation for meticulous planning and preparation.²⁵ Now it was helped by having over a year to make plans, not having to make dramatic changes and not having to continue the fighting much beyond the initial rush.²⁶ There was a small argument about how far the initial rush should go, with Second Army, rather than GHQ, being the ones to insist on greater gains to include the German artillery line. GHQ was told 'we must get those bally guns' behind the ridge, and plans were eventually so drafted.²⁷ Still, it was the first effort by General Plumer and his artilleryman, George Franks, and they had to rely upon learning from others' examples. The yardsticks and rules-of-thumb from years of experience were applied and combined with the experience accumulated in smaller actions in the Ypres Salient. CB artillery was allotted according to formula, the bombardment, wire-cutting and barrage were all done at standard rates.²⁸ In all this Plumer had complete confidence in Franks, even to the point of allowing Franks to go on leave, returning only days before the attack.²⁹ This may have been scheming on Plumer's part, for with Franks away he had an excuse to avoid changing the artillery plan according to the vicissitudes of GHQ. Whether or not Plumer was devious, GHQ did interfere at the last minute.³⁰ There was no complaint with the nature of the bombardment - there could have been few, since it came straight from GHQ publications - but suddenly GHQ wanted to blow up the mines early simply to improve CB effort. The Germans would presumably think

²⁵ So detailed and complete was the planning that IX Corps' plans for operations, administration and artillery were printed by the US War Department as examples for fledgling US staff officers. US Army War College, eds, Artillery Operations of the Ninth British Corps at Messines, June, 1917 (Washington, DC: GPO, 8/17); The Attack of the British 9th Corps at Messines Ridge (Washington, DC: GPO, 8/17).

²⁶ Time available did not lessen the volume of paperwork and Neil Fraser-Tytler wrote on 3/6/17 'On my way back I called at Brigade Headquarters for tea and found them up to their necks in paper connected with the most ambitious and complicated Artillery Barrage that has ever been evolved by the British Army. On being bribed by the Colonel with a well-polished Dunhill pipe, I weakly promised to lend them for a few days my private Corona Typewriter to enable them to cope with this flood-tide of paperwork'. N Fraser-Tytler, Field Guns in France: With a howitzer battery in the battles of the Somme, Arras, Messines & Passchendaele 1915-1918, (Brighton: Tom Donovan, 1995).

²⁷ letter 11/5/17, Harington to Davidson, Rawlins Papers, f12a/13.

²⁸ letter, Birch to Harington (MGGS Second Army), 16/5/17, Anstey Papers. GHQ did intervene, but to increase the number of heavies Second Army requested. Anstey galley proofs, p160.

²⁹ Obituary, RA Regimental News, 12/58.

³⁰ WO158/215, OAD458, 24/5/17 but especially 29&30/5/17

the infantry attack was underway and fire their counter-barrage, thus revealing their hidden batteries. That Birch should ever conceive such a plan and get Haig's approval shows how much more important CB work was compared with destroying German trenches. As we know, this bizarre plan was not implemented; Second Army appeased GHQ's CB mania by increasing still further the percentage of guns on CB work and altering barrages.³¹

Again before the launch of the Third Battle of Ypres there was a pause in British operations. This was necessary to shift men and guns and organise administrative affairs as well as operations. There was also the problem of taking over a section of front from the French for Fifth Army and the coastal sector for XV Corps. Furthermore, there were no plans ready on the shelf as there had been for Messines.³² GHQ's plans were mostly strategic (clearing the Belgian coast) rather than operational (taking the Gheluvelt Plateau), and nobody had adequately addressed the tactical problems. At one conference at Fifth Army HQ the bombardment's duration was not even on the agenda, and was only raised as a question from the floor.³³ While Haig was keen to attack in Flanders and had strategic reasons for so doing, he certainly should have issued warning orders to start the planning process; perhaps he was constrained in doing so by the lack of Cabinet support and the (only recent) re-emergence of the BEF from under French control as the Prime Minister had arranged at Boulogne. In the end there was a gap of seven weeks between Messines and the first infantry attack of the battle of 'Passchendaele'. Not all of this was devoted to building roads and training troops; there was time to digest some of the lessons from Messines. Plumer's staff provided the grist for two SS pamphlets; several others would come out in July or August 1917 distilling recent events for the rest of the BEF.³⁴

The Germans did not waste the time offered, building a large number of pillboxes. These imposed a further delay on the British offensive, as the infantry wanted most of the pillboxes destroyed before they attacked.³⁵ The BEF was in an unfavorable geographical situation -

³¹ Birch still poked into the details, lecturing Harington on how to conduct the CB operations. letter, 27/5/17, Anstey Papers.

³² There was a rather feeble idea for a tank attack, devised in the winter, which seems to have sunk under its own weight. Haig Diary, 10 2/17. Second Army did some planning in January 1917, but no action was taken in the intervening months; WO158/38. Andrew Wiest has examined matters closely:

³³ General Sir Ivor Maxse Papers, IWM, f35 1.

³⁴ SS170 '... Co-operation between Aircraft and Artillery ... on the Second Army Front', SS172 'Preliminary Notes on Recent Operations ... Second Army' (7 17); SS131 on RFC co-operation (8 17), SS135 '... Training of Divisions for Offensive Action' (8/17), SS175 on the use of smoke (8/17).

³⁵ This even led to considering use of AP shells to crack pillboxes by direct hits. MUN4/3377 and WStC Bland Papers (RAI Military Document 1126) letter, Headlam to Minister of Munitions, 31/7/17.

overlooked and encircled - and destroying pillboxes further delayed the offensive. The Germans also decided to fight rather than withdraw to a fresh line further in rear, and they fed in reinforcing guns which meant the RA was over a month in gaining the upper hand. That Flanders was the chosen arena for the year's major British offensive, despite its technical unsuitability for artillery, only reminds us that the BEF placed infantry and cavalry first. The artillerymen knew it was a bad place for them and commented on it freely but did not seek to change matters.

Eventually the CB struggle was won - at considerable cost in guns, gunners and fatigue³⁶ - while concurrently the German positions were bombarded. In the circumstances there was never any doubt the bombardment was going to try and destroy the bulk of the German defences. Topography favored the Germans to an extent that any surviving artificial defences could mean an impregnable defensive line. Furthermore both the MGsRA involved, Charles Buckle of Second Army and Herbert Uniacke of Fifth Army, supported thorough bombardments.³⁷ The bombardment was heavy, prolonged and thorough to the extent that for weeks to come German barbed wire was no obstacle.³⁸

The Third Battle of Ypres famously did not go as planned and later phases literally bogged down. Through August 1917 a variety of attacks were made trying to capitalise on preparations already made rather than approaching each action as separate in itself. Most of these failed and most of the lessons learned were about barrages rather than bombardments. In early September Haig handed most of the responsibility over to Plumer's Second Army, which set to methodical preparation of the next attack, including heavier bombardments than recently.³⁹ Plumer regained the CB edge, eroded in August by switching to other targets, while also extensively destroying German defences. In large measure he did this by

³⁶ The Germans adopted new CB tactics suitable for the congested Ypres Salient. Rather than trying to destroy batteries, they opted for area shoots and harassing fire, often at night, to disrupt and deny rest. Night bombing was also used. Judging by memoirs and accounts, it was an effective policy.

³⁷ Buckle had replaced George Franks on 7 July; Franks went to command of 35th Division. This was probably not Franks being removed for cause; he had been in his post for over 18 months and he had done little wrong. Franks may also have been tired: he did not command 35 Division long and went to a Home command when he left the Division. More interesting was the promotion of Buckle: he was one of the first RGA officers to be a Corps BGRA (7/1916) and was the only RGA officer to be promoted MGRA, finishing the War in that post with Rhine Army.

³⁸ mentioned in Robin Prior and Trevor Wilson, Passchendaele: the untold story, (London: Yale, 1996), p115n10. It was a vast problem: for a front of 13,200yds, Second and Fifth Armies had to cut over 200 linear miles of German barbed wire, much of which would be in considerable depth as well. WO158/38

³⁹ Mirroring the methods urged by some at GHQ, although with a week between attacks rather than 2-3 days. memo, Davidson to CGS 26/6/17, WO158/20. This is not to say Plumer was following Davidson's ideas (or harking back to du Cane's March 1915 memo), but neither was he alone.

concentrating guns to a greater extent than previously - he simply had more material to work with, and he took his time to make sure things were done properly.⁴⁰ In this Haig gave him more latitude than Gough had in August; there was a dim realisation that momentum had to be built up via a bombardment. Throughout the campaign co-ordination of bombardments was excellent and they worked extremely well, always provided enough time was allowed between attacks. That the RA was able to do so well in such an unfavorable sector as the Ypres Salient suggests the battle would have been more successfully mounted elsewhere.

This is perhaps best seen in an area where attacks did not take place: XV Corps' coastal sector. There the artillery situation was actually unfavorable, since the Germans could use many of their super-heavy coastal guns. Careful calculations were made on how many British guns would be needed and the length of time required to win the CB duel, then to bombard the German positions.⁴¹ It was recognised there was no point in stretching out fewer guns over a longer period. Haig noted the operation was 'an artillery problem' and examined the papers, but in a rather cursory way.⁴² In the end the coastal attack was never made but it provides a rare example of the chess-like artillery struggle, predictable several moves in advance, overruling an operation.

Another operation taking place during the Passchendaele campaign and largely driven by artillery was Canadian Corps' battle outside Lens. Ordered to make a diversionary attack on Lens, Arthur Currie, commanding the Corps, successfully argued he should capture the dominant Hill 70 rather than attack Lens direct. His reasoning was that powerful artillery would allow the hill to be taken more cheaply and retained at less cost. GHQ approved his planning and the results proved the method. However it was not possible to make similar attacks: shells and guns were needed for Ypres and the Canadian guns' firing rate considerably wore their barrels, a great concern throughout 1917.⁴³ Haig expressed his preference to continue the attack, but allowed Birch to overrule him, demonstrating where authority was - and was not - delegated. The battle also shows GHQ still having different attitudes towards limited attacks (whether they be preliminary or diversionary) and major offensives. One category was admitted to be limited by the technical means available, but the other was not and could be driven to greater results by determination, willpower and leadership - the traditional army qualities.

⁴⁰ OH1917v2, p239 credits twice the weight of shell in half the area as before 31st July.

⁴¹ WO158/239.

⁴² Diary, 11 6/17; WO158/239 with Haig's marginal notes.

⁴³ Haig Diary, 5/7/17, 2/9 17.

By the later stages of Passchendaele the BEF was already planning another attack, of a very different nature. The battle of Cambrai depended on two elements, tanks and a surprise artillery barrage, thus dispensing with any bombardment. The genesis of the plan came from a relatively junior RA officer who got the ear of the army commander, Byng, who took them up himself.⁴⁴ It only reinforces the artillery's subordinate role, that Lecky (the MGRA) opposed the plan but threw himself into it as best he could when over-ruled.⁴⁵ Tanks and guns combined to make the attack possible; its reputation as the first tank battle has too much hindsight. The story of Cambrai has attracted huge attention and only a few points will be brought out here, mostly contrasting it with Allenby's plans for a surprise attack.⁴⁶ Because tanks would do the wire-cutting the artillery were spared several days firing, which meant surprise could be used operationally rather than just tactically: the whole battle surprised the Germans, not just the timing of Zero hour. As the Germans were not warned there were no reserves specially in the area (unlike Arras) and no prolonged CB struggle before the attack (unlike Passchendaele). Allenby had wanted to minimise wire-cutting but GHQ were reluctant to trust what looked like half-measures. Now there was an ironclad guarantee of wire-cutting, Byng's plan was passed. The artillery also benefitted from a technical revolution coming to fruition. Struggling with an enormous learning curve of teaching new soldiers gunnery and teaching everybody more advanced gunnery, by late 1917 all the pieces were in place. Guns could be calibrated behind the line, meaning they did not have to be registered with deliberate - and inconceivable - fire.⁴⁷ The differences were first appreciable to those furthest forward who dealt with the details of gunnery on a daily basis. By mid-1917 some Corps were exploiting the new technology and by the end of the year it had percolated up to GHQ. It is not clear how many gunnery details were explained to Byng, Haig and their GS officers but it does not particularly matter: they grasped the essential point that a new artillery method was available and they allowed its use.

⁴⁴ Brigadier-General H H Tudor. Tudor was deputising for his superior (on leave), giving him a better chance to spread his ideas. Sir Hugh Tudor Diary, RAI Military Document 1167, 7/17. J P Harris, Men, Ideas and Tanks: British military thought and armoured forces, 1903-1939, (Manchester: Manchester University Press, 1995) pp108-113 charts responsibility for the idea, quashing Tank Corps claims and elevating the role of Byng, the Army Commander.

⁴⁵ Sir B Brooke, 15/5/45, CAB45/118. Presumably Lecky remembered his predecessor's fate the last time Third Army tried something new with artillery. Or the reports of him as dim may have been true, eg CE Vickery, CAB45/116.

⁴⁶ The artillery Instructions are printed as Appendices 6A B and C in OH1917v3.

⁴⁷ This is another triumph of the SS pamphlets, for there was no official contact between Kirwan, who had devised screen calibration, and Tudor, who turned the technology into tactics. See EA James Papers, IWM, for movements by 9th Division; Tudor's diary shows he learned of screen calibration on 16/11 17, months after submitting his plan.

In some regards this is remarkable. GHQ had rejected a plan with strong traditional elements, and now was happy to adopt - even expand upon - a plan explicitly admitting there would not be complete 'preparation' of the German defences. The time had arrived - as it had not earlier in the year - when the technical changes that had percolated throughout the BEF added up to a revolution, and Birch did not intervene as he had earlier. GHQ now trusted senior subordinates who had ideas of their own, a significant loosening of its centralised command structure. It is not simply that GHQ were too busy overseeing the last days of Passchendaele, for they were engaged in the planning of Cambrai and Haig himself spent several days inspecting the training of the divisions involved.⁴⁸ In much more than the presence of tanks and the absence of a bombardment did Cambrai foreshadow the battles of 1918.⁴⁹

Yet senior artillerymen were still not trying to change the supporting role of artillery. Herbert Uniacke, having commanded Fifth Army's artillery through the year's battles and also handled the actual planning of the battle of Arras, drew up his lessons of the year.⁵⁰ His tactical notes alone stretch to twenty pages and cover a great range of detailed comments on how the artillery can produce the most effective fire. But he never lost sight of the reason for producing that fire, his last sentence being

As the enemy changes ... his methods of defence ... so we must modify ... our methods of Artillery attack in order to break down that defence, allow our infantry to assault with a reasonable prospect of success, and gain their objective with the minimum of loss - always bearing in mind that the final decisive factor is the bayonet of the Infantry soldier.⁵¹

Uniacke clearly actively sought the best way to orchestrate his guns and had realised that success was more than just seizing ground, it was in seizing it at least cost. However, his bottom line had not changed: support the infantry as best he could.

There were no British attacks in 1918 until the German momentum had been spent, and defensive tactics were the order of the day. But immediately the Germans wore themselves out

⁴⁸ Haig visited Third Army divisions from 12th through 15th November, and attended a conference of the Corps Commanders on the 16th. Haig Diary.

⁴⁹ Fifth Army's MGRA, Herbert Uniacke, came to this conclusion without having much experience with tanks: 'If therefore we are ever going to pluck the fruits of victory, we must shell less lavishly or rather less destructively'. Uniacke Papers RAI, VII 2, 'Lessons from the 1917 Battle Fighting of the Fifth Army from an Artillery Point of View'.

⁵⁰ Uniacke Papers, VII/2.

⁵¹ original emphasis

against the Allied line it was time to resume the Allied offensives. Initially only minor operations were launched, improving the local situation with perhaps a battalion of men.⁵² Sometimes tanks were employed, most notably at Hamel.⁵³ Typically there were no tanks but it was equally seldom there was a bombardment. Mostly this was because the German defences were extremely weak - in the absence of strong defences, there was little need for a bombardment.⁵⁴ Attacks therefore went ahead under the cover of a barrage and CB fire, more like a raid in ordinary trench warfare. There were exceptions depending on the local situation, again emphasising the new de-centralisation in the BEF. At Meteren 9th Division fired an identical bombardment against the German positions every day for a fortnight, finally attacking on the fifteenth day. The German defences had been obliterated and the Germans had become accustomed to being shelled without an infantry assault so when the attack came it had tactical surprise, and casualties were low. As a further indication that decision-making was decentralised, the Divisional Commander was Hugh Tudor, part-responsible for the surprise attack at Cambrai. Not wedded to bombardments nor surprise, he responded to situations however was appropriate. This flexibility also reiterates the evolutionary British tactics: had there been a conscious revolution there would not have been these 'old fashioned' attacks. As it was, there was no revolution and officers simply did what was necessary. At the same time the artillery had become so sophisticated, so thoroughly trained that individual guns were given bombardment tables that minutely recorded their tasks.⁵⁵

The same was true in larger operations. Most of the details for the battle of Amiens were settled between ANZAC Corps and Fourth Army without involving GHQ.⁵⁶ Since conditions were ripe for a surprise attack, one was launched.⁵⁷ When the Germans fed in men and guns, also falling back to decent defences, momentum petered out and the battle was wound down. A step-by-step advance was planned, complete with bombardments, but GHQ

⁵² Haig noted about a dozen minor British attacks, or German withdrawals, between July and September. This is an imperfect index but suggests how much more fluid the Western Front was in 1918.

⁵³ Hamel was so successful it was written up in detail in a 'Note on Recent Operations' and also as SS218. It also benefitted from having more artillery than the fighting at Hill 70 the previous year when there were no tanks and much stronger German defences. Haig Diary, 4/7/18. Although an operation involving less than a division of infantry, Haig and Birch had visited Corps HQ to observe preparations. Diary, 1/7/18.

⁵⁴ A point made by Army Commanders at their 11/6/18 conference, where it was pointed out 'Infantry ... must be trained to fight and manoeuvre under cover of artillery fire ... rather than to rely on the invariable support of a dense barrage'. OAD291/33/1.

⁵⁵ Army Form W3981, 'Barrage Table for No_ Gun', J Batten Papers, RAI Military Document 1348.

⁵⁶ Rawlinson Papers; Rawlinson Diary, 21/7 18.

⁵⁷ So crucial was surprise Rawlinson ordered 'Previous to Zero night no circumstance less than an actual attack in force by the enemy would justify ... disclosing [the] concentration of guns'. letter 32(G), Fourth Army Papers, v49.

instead opted to launch Third Army forward in a surprise attack.⁵⁸ In this case it was not Third Army petitioning to attack, but GHQ deciding that a surprise attack on weak German defences was a better choice than renewing even a strong, prepared attack against strong defences. Numbers and quality of artillery had restored surprise as a weapon and gunners could advise formation commanders whether it was appropriate or not. By 1918 this was the sort of decision GHQ was taking rather than the detailed operational and even tactical interventions of 1916 and 1917. In short order all the British armies were unleashed in surprise attacks and all gained ground. GHQ became enamored of the surprise attack, at one point encouraging Fourth Army to try and bounce the Hindenburg Line - at its strongest sector - without either bombarding it first or tank support. Rawlinson complained⁵⁹ and his objections were accepted, showing a more balanced relationship between Army Commanders and GHQ and still showing the gunners in the wings, advising. Rawlinson's chief gunner, Charles Budworth, had already noted 'Although no preliminary bombardment preceded the attack on July 4th, it would be dangerous to assume that this is applicable generally to all future operations'.⁶⁰ As events developed, the bombardment worked well and German morale (that chimæra of 1915-17) was crushed while the defences were still largely intact.⁶¹ Haig also talked the Belgians out of a preliminary bombardment when clearing the Ypres Salient, a sure sign conditions there had changed.⁶² Once the Hindenburg Line had been broken, the Germans generally retired, not standing to fight unless the British artillery had fallen behind the advance. When this happened there could be quite stiff fighting and heavy bombardments - probably the heaviest at Valenciennes, just days before the Armistice.⁶³ Budworth reflected afterwards on the success that his bombardment had against the Hindenburg Line, noting both that it was deadly for the Germans and life-preserving for the British infantry, continuing to show his appreciation that, however important and effective it might be, the artillery's purpose was to support the infantry.

⁵⁸ First and Third Armies had been preparing attacks before Amiens, as diversions. Now the short pause was ironically covered by Fourth Army's methodical preparations.

⁵⁹ letter 270(G), 19/9 18, Fourth Army Papers, v49.

⁶⁰ Rawlinson Papers, 'Remarks on Artillery Action based on the operations of July 4th 1918'.

⁶¹ Birch to Edmonds, 8/7 30, CAB45/132. German morale was already depressed, but the bombardment was the coup de grace.

⁶² Diary, 18/9/18. Oddly, the previous year Tudor had wanted to attack the Menin Road Ridge without a bombardment: diary, 26 9 17.

⁶³ The Canadians organised fire of a 6" howitzer shell per 100yds per 38 seconds, at times per 14 seconds; the lethal radius of such a shell was 500yds. This was in addition to other heavy and field artillery. For full details see AGL McNaughton 'The Capture of Valenciennes: A Study in Co-ordination', Canadian Defence Quarterly, v10 no3 (4/1933), pp279-94.

The preparations before an offensive are the surest way to see how an army sees itself. After the problems encountered by all parts of the BEF in the earlier part of the war, there were improvements in operations doctrine. In the first days the artillery was virtually ignored, then its views were canvassed but still only very partially implemented. Only after the British army received its first large dose of combat experience did use of artillery (and other arms) substantially improve. Throughout the war the Royal Artillery put forward its suggestions on how it could best help the combat arms, but accepted its subordination to the combat arms. As the whole of the army became more experienced it became a better judge of what artillery could or could not do, and adjusted the requests made of the artillery. The changes made were rather a reflection of greater understanding of artillery within the army as a whole than from artillerymen demanding different treatment. A junior staff officer after the war urged greater co-operation between the arms, co-operation that should actually go both ways, but prefaced his entire article 'Let it be granted ... the great ideal of "gunners" is to support their infantry properly...'⁶⁴ Because the artillery improved its techniques and tactics gradually over time, rejecting any radical change to either tactics or its place in the army, there was no trouble in using 'old' tactics when they were suitable. The continuity of purpose through changing means Haig summed up in a letter to a former ADC: '...the arty [sic] methods employed [at Neuve Chapelle] were in front of anything which the French were then doing, and they also formed the basis on which our own artillery plans were based right up to the end of the war'.⁶⁵ There had been no break with the past, and generals drew together those elements that would work in the circumstances rather than applying some new formula and having to stop operations when some new ingredient was temporarily lacking.

⁶⁴ 'F.W.' 'Artillery and the General Staff', Journal of the Royal United Services Institute 64:455 (8/19), pp470-77.

⁶⁵ Haig to Boraston, 24/6/26, Colonel JH Boraston Papers, IWM.

The 'Counter Blaster' and Counter-Battery Work

Before the war the British army virtually ignored firing at enemy artillery. FSR gave it no space, and FAT only seven paragraphs.¹ The main objective of the artillery was not to master the enemy's batteries, it was to aid the infantry in their building up a fire superiority over the whole of the enemy's forces to permit 'the climax of the infantry attack'. Any gun duel was subordinate to the broader interests of the battle as a whole, yet naturally the technical details were for the gunners to master. Throughout the war the effort devoted to negating the effects of German artillery, by whatever means, fluctuated but it fluctuated in line with the (perceived) needs of the attacking troops. In the first two years of the war resources were too few to allow of any part of artillery work to be satisfactory and counter-battery (CB) work was largely an afterthought. After the experience of artillery power - on both sides - during the Somme offensive a new system was created which delegated CB work solely to the artillery. This was only a delegated responsibility; CB work was handled by the artillery, but within parameters set by others. However, it was eventually obvious to all that mastering the German artillery was vital, and extraordinary efforts were made to that end. The search for new methods for CB work was constant, and their development was one of the key steps that allowed changes in battle tactics late in the war.

Pre-war lack of emphasis was based on the experience of the Boer War. Then the British had tried an 'artillery duel' against the Boers, vainly showering kopjes with shells but seldom suppressing the Boer guns. On the other hand, the Boer artillery was little threat to British infantry: there was little of it and it really only harassed. It annoyed the British infantry and cavalry to be under fire at long range but the very small results unfortunately led them to underestimate the potential. With the Boers' defeat the idea of the artillery duel died, and nothing had replaced it for European warfare. Meanwhile in 'irregular warfare' against an 'uncivilized enemy' it was assumed the enemy would not have artillery. For continental warfare it was benignly assumed the British would have a slight superiority of artillery. One participant bitterly noted afterwards 'The occasional mutual contest of field batteries was all that was foreseen by our pre-war manuals'.²

The artillery had more detailed ideas on how to actually engage its targets, but they would shortly look obsolete. Most enemy batteries were expected to be in the open, or at least

¹ FSR1909, §106, ¶5; FAT1914, §223.

² Rawlins, History, p250.

only partly concealed; these were to be shelled 'till [their] fire is mastered'.³ Neutralisation was the goal, the guns presumably to be captured by the advancing infantry; destruction was considered possible but neither critical nor likely. Heavy guns would be needed if enemy guns were dug-in, but the main target was still the battery personnel; entrenchments might be engaged with HE, but the guns were not targets. There was no consideration of the defender's artillery in sieges; the siege was against enemy positions.⁴

These ideas were not greatly revised in light of the Russo-Japanese war, which had seen the withdrawal of artillery from direct-fire positions. Two sentences devoted to shelling enemy observation positions presumably solved the problem of concealed guns.

In 1914 relatively simple methods worked as long as the Germans put their batteries in the open. At N ry, 'L' Battery RHA won immortality and three VCs by blasting a German battery at point-blank range. At Le Cateau the British were not the only ones to deploy their batteries in open positions, and German batteries were shelled until the British guns had to help their own infantry.⁵ This was not to become the pattern, though, and the British soon found themselves having to deal with German artillery they could not see. The Aisne with its deep, narrow valleys was a great trial for the mainly flat-trajectory British artillery. Guns had to deploy well behind friendly lines, often putting them out of range of German guns; their trajectory also meant they had to choose poorly protected positions.⁶ The Germans also held the higher ground, reducing British observation whilst enhancing their own; both sides used rudimentary aerial observation.

Because so many of their guns were out of range, the British response was limited. Only the 60prs were much use; Sir John French once personally organised all the 60prs to engage German batteries in rotation and Haig several times organised counter-battery fire.⁷ The RFC helped spot German batteries, marking them on a gridded map so they could be engaged later. The pilot would scribble upon his map, circle back behind friendly lines and drop it, hopefully near a headquarters. Choosing which target would be engaged was the first serious task given to Divisional CRAs.

During most of the autumn and early winter the Royal Artillery was simply too busy providing direct support for the infantry to pay much attention to CB work. In the advance to

³ FSR1909, p133.

⁴ FAT1914, pp347, 276.

⁵ John Terraine, Mons: Retreat to Victory, (London: Batsford, 1960), p147.

⁶ OH1914v1, pp434-6.

⁷ Ibid., p419; Haig Diary 16/9 and 4/10/14.

Ypres, the artillery was usually divided into penny-packets, working up with the infantry - even single guns were pushed forward to boost the infantry's firepower. The only guns reliably available to central commanders until heavier howitzers arrived were the 60prs, and even once heavier artillery was available it was too precious to use on a secondary mission.⁸ Most Divisions formed infantry brigade-groups, attaching some guns; these were technically temporary but 'the battle was mainly fought in these groups'.⁹ Once the fighting at Ypres fizzled out, batteries were pulled back a bit and better communications facilitated concentrating fire. This concentration was only possible with adequate communications, and it was quickly realised even more effort was needed to improve signal links. General Smith-Dorrien in November 1914 urged more signallers for the artillery because German 'artillery fire has been more concentrated and more flexible'.¹⁰

At this time there was still a feeling that CB was a lesser form of artillery fire, since it was not directly supporting the infantry. CB work was somehow 'defensive' and therefore inferior; it was hoped that the initiative could be regained and artillery returned from merely neutralising German guns.¹¹ This serves as a reminder that CB in this period was just retaliation to make the Germans cease firing, not aggressively destroying guns. Combined with the frantic shortage of shells, there was virtually no counter battery fire - at one point only three guns of an armoured train had to handle the bulk of CB work around Ypres - but this was only a response to the pressure of the situation. It would not have benefitted the BEF, or the Allied cause, if the RA had won a counter-battery fight whilst the British infantry were swept away and the line broken. Artillerymen realised there was no point in a gun duel that did not help win a battle. In the circumstances, infantry support was the critical task and the artillery did it.

Without the guns to spare for CB work, there was no pressure to create a system to handle them. A CRA was responsible to his Division Commander for artillery matters, and it fell to him, unless his guns had already been devolved to infantry brigade-groups. With so few heavy pieces artillery was rapidly divorced from its divisions. Some fell under Corps command and some under Armies. For instance 1 Canadian Division lost its Heavy Battery to ten different Corps for over a year and 2 Canadian Division lost its for a similar period.¹² So

⁸ OH1914v2, pp81, 82, 83, 106.

⁹ Ibid., p134n6.

¹⁰ Smith-Dorrien to GHQ, 4 11 14, WO95/654.

¹¹ CDS2, 'Notes from the Front', 11/1914.

¹² Nicholson, Gunnery of Canada, pp222, 244, 240.

badly wanted was medium artillery many Heavy Batteries went abroad ahead of 'their' divisions.¹³

The winter of 1914-15 was generally quiet as both sides learned about trench life and hoarded shells, each feeling the other had the advantage. During the winter all heavy pieces (everything manned by the RGA) were consolidated into 'Army Artillery'.¹⁴ Yet it was not fought directly from Army headquarters, instead being formed into Heavy Artillery Reserve Groups under Brigadier Generals.¹⁵ Often heavy artillery was not even commanded from the HARG HQ, but turned over to the Corps. Early in 1915 CB was controlled by Army, with some guns retained for this and others parcelled out to Divisions.¹⁶ In 1915 the Corps was to start becoming the main level of artillery control, but there was still inadequate staff. Instead, most medium guns would be spread among Divisions while Corps only kept howitzers for itself.¹⁷ Before Corps was recognised as the key command echelon, there had been CB offices opened at divisions, and the rapid changes did not lead to progress.¹⁸

The HARGs were responsible for much more than just CB; they initially had all the BEF's heavy artillery and were responsible for every aspect of its employment. CB was still not a high priority, thanks to the shortage of guns and shells. In ordinary trench warfare it was usually adequate to 'retaliate' against some 'tender' portion of the German line if the German guns were active. When the German batteries were not 'identified', this was all that was possible. However, frequently German batteries were deployed well forward, sometimes in sight of the British front line, and retaliation was simple. Also, the Germans had a habit of posting batteries near villages and the village could be bombarded to register British disapproval. It should be noted that this forward deployment of German artillery was a sign of the weakness of British CB, and when casualties mounted the Germans pulled back. At this point the only sources of information on German gun positions were still forward observers and the RFC scribbling on maps. Even when the BEF attacked, CB was a lower priority than bombarding German trenches. The German emphasis was on machine-guns and rifle-fire, not

¹³ see AF Becke, Order of Battle of Divisions (London: HMSO, 1935-45); most TF and K1-3 divisions had this happen.

¹⁴ OH1915v1, pp86-7.

¹⁵ There was a brief period as Reserve Heavy Artillery, but there was another, more influential, RHA.

¹⁶ Second Army favoured this: V Corps CHA diary (WO95/757), 30/11 15.

¹⁷ OH1915v1, p313.

¹⁸ JBA Bailey, Field Artillery and Firepower (Oxford: Military Press, 1989), p62n61. (hereafter, Bailey, Field Artillery)

on counter-bombardment and defensive barrages. As long as the main strength of the defence was the front trenches, they would be the main targets.¹⁹

The first significant British attack under trench warfare conditions was at Neuve Chapelle, 10-12 March 1915. There were several important firsts, but CB was not one of them. Few German batteries were in the area and these were already known: at best they were in only semi-covered positions so their muzzle blast could be seen. Under these circumstances the British used most of their medium guns to barrage German communications rather than fire at German guns. Only two batteries of 4.7" guns were detailed for CB, and one had other tasks first.²⁰ Yet in a foretaste of how changing German tactics would force British responses, by 12 March all but seven heavy pieces were firing CB.²¹ The British repeated the attack up Aubers Ridge in May. Now a 60pr battery was on call to an aeroplane that was watching for new German batteries in addition to other batteries that had programmed targets.²² These promising steps were neither followed up nor was there enough artillery to go around.

By the end of May ideas had already changed so that destructive CB was preferred before an attack, due to its 'morale effect'.²³ Neutralising fire was necessary during an attack, and these two points would be the keystone of future CB policy. CB work was not a high priority because there were more important things to worry about. The Germans had thickened their defences and were using more MGs but not many more guns. MGs had to be overcome else an attack was certain to fail; German artillery was less certain to cause problems. There was still no good way to locate concealed artillery, so 'retaliation' was the main CB method. With these conditions there was little prospect of destroying German artillery, nor were there shells to make a methodical attempt. Instead orders were issued merely to respond to German fire: during Loos I Corps told its RGA 'to be prepared to reply' if the Germans shelled.²⁴ This could not significantly affect German artillery. People were trying to deduce what the proper method should be, but it was recognised that the answer was not going to be put into effect until more materiel was available.²⁵ While thinking was proceeding, it was not necessarily tied

¹⁹ V Corps CHA diary (WO95/757), 2/3/16, No1 HARG diary (WO95/86), 13 4/15, No2 HARG diary (WO95/87), 9-10 5 15.

²⁰ No1 HARG diary (WO95/86), 9-10/3/15

²¹ *ibid.*, 12 3 15.

²² *Ibid.*, 9/5/15.

²³ *Ibid.*, 24 5/15.

²⁴ I Corps BGRA diary (WO95/619), 27 9/15.

²⁵ No1 HARG diary (WO95/86), 10 5 15 and 14/6/15.

to operations. At Loos IV Corps made no efforts to arrange CB work, nor did it encourage divisions to do so.²⁶ Afterwards, more attention was paid to CB work, guns were earmarked for CB, Armies started producing 'Active Hostile Battery' lists and daily reports were started.²⁷ One bad habit continued, that of using only medium guns for CB. Without the chance of destruction, neutralising German gunners with shrapnel was the most efficient solution and only medium guns had the range. The habit grew in 1916 into earmarking only the medium guns for CB purposes, forgetting the conditions that had first produced the policy.

These conditions were going to change in 1916: the British supply of shells and guns grew, command arrangements changed, but most importantly German tactics forced new answers. Still the main emphasis was on bombarding German trenches rather than CB: the attack frontage was determined by multiplying the number of heavy howitzers by 100yds. From February there was prospect of a variety of artillery tasks - CB but also long-range firing - being more centralised than divisions, but the brand-new system was untried. There was still division of responsibility between Corps and Divisions, II Corps for instance leaving retaliation to Divisions but keeping planned destructive shoots for itself. Alternatively to cover a raid CB might be run by the division which would know the situation better.²⁸

There was no great amount of CB work in the seven-day bombardment before 1 July, nor was there much impetus from above. CB was still not a high priority: it was third, behind harassment and wire-cutting.²⁹ When the preparatory bombardment had to be lengthened it was because the German trenches were not damaged, not because of German artillery. Corps were left to decide for themselves how best to handle the German artillery which inevitably produced significant variations. One Corps allotted only a minority of shells from a few guns.³⁰ Some Corps did not pay the German artillery much attention; they were quite busy enough bombarding enemy defences, cutting wire, interdicting communications, firing feint barrages and planning how to support the infantry. This was another ill effect of trying to penetrate the German lines too far, beyond the obviously inadequate destruction of German defences. Neutralisation, often by retaliation, was generally sought.³¹ This would kill German gunners and might damage guns, but there was no plan to destroy a significant

²⁶ IV Corps BGRA diary (WO95/728), 2-26/9/15. This may have been a local problem with the chain of command: see Chapter 9.

²⁷ Rawlins, *History*, p105; III Corps BGRA diary (WO95 689), 22/11 15.

²⁸ II Corps BGRA diary (WO95 651), 25/4/16, 26/7 16

²⁹ III Corps BGRA diary (WO95/690), 28/6/16.

³⁰ X Corps CHA diary (WO95 866), c18/6/16.

³¹ V Corps BGRA diary (WO95/756), 2/9/16.

percentage of German artillery. At one level it was realised that the CB resources were still inadequate for sufficient destruction before Z Day; the decision then had to be made how best to reduce the effectiveness of the German guns. Some formations thought it was best to force German batteries to move, so reducing their effectiveness; others thought it better that the BEF know where the Germans were so neutralisation could be organised. X and XIII Corps had clever schemes to fire on German howitzers (being most dangerous to infantry in trenches) before Zero Hour and neutralise field guns (the threat to troops in the open) once the infantry advanced.³² Also, gas would be used for neutralisation on Z Day since it would significantly hinder their gunners. When gas shell was available field howitzers were taken off their usual tasks and put onto CB work; French 75s were also allotted to CB because they had gas shell.

Neutralisation was recognised as the key during an assault, a trend that only increased. The German defensive barrage was not the biggest problem on 1 July but later in the Somme campaign as the British artillery pulverised German defences it became a far more important element of the defence. Much as the British prepared for attacks, the Germans used heavy bombardments to prepare their counter-attacks. At this juncture the priority of CB rose dramatically. It became typical for neutralising CB to begin at Zero or even slightly before, although some Corps in Fifth Army took the bolder step of waiting perhaps three minutes after Zero, then neutralising those German batteries that opened fire. This had the benefits of not wasting British shells, catching the German gunners in the open and not telegraphing that the barrage on the German front lines necessarily signalled an assault.³³

Destructive CB was also attempted in the middle of battle, but usually in the pauses between attacks. Generally it had little success since targeting was not highly developed; it also tended to cause German batteries to remove from the site of their bombardment. This actually caused more problems than it solved, for German positions would then be unknown at the critical moment of assault, thus solving the planing dilemma. Late in the Somme offensive this problem was recognised; the solution was straightforward, noting the locations of German batteries but not firing on them until Zero. Neutralisation might then be undertaken for a given period with a pause to see if any German batteries were eager for more. These would then be dealt with again.³⁴ Unfortunately, for various reasons - most apparently coming from higher command - this would not be fully adopted for some months.

CB was drawing attention in higher circles. Armies had to adjudicate boundaries

³² X Corps CHA diary (WO95/862), c18/6/16; XIII Corps BGRA diary (WO95/901), 23/6/16. VII Corps had exactly the opposite idea: VII Corps BGRA diary (WO95/811), 13/6/16. VII Corps' CHA, CR Buckle, was promoted in July 1917 to be MGRA at Second Army.

³³ III Corps BGRA diary (WO95/690), 12/8/16. This was dropped as too risky, CB starting at Zero.

³⁴ II Corps BGRA diary (WO95/651), 8 & 10/1916.

between Corps, and one MGRA took an active role in fostering thoughtful staff work.³⁵ Virtually all Corps that passed through Reserve Army (later Fifth Army) during the Somme started filing a number of daily reports, several of which were useful for CB.³⁶ Their organisation became more efficient, largely due to the influence of Herbert Uniacke, Major General RA for Hubert Gough.³⁷ There is no indication Uniacke influenced Gough's choice of attacks, but he certainly made the best use of the artillery he had, both on the Somme and at Third Ypres.

Uniacke's reports were an important first step towards the elaborate and thorough intelligence system that would support CB work in 1917. The RFC had to be integrated to best effect; methods had to be decided and then spread from above. The critical series of Army pamphlets 'Artillery Notes' was begun in January 1916, and updates and revisions came thick and fast thereafter. Intelligence was growing in importance which led to more conferences involving more specialists; this expanded and became more systematic in 1917. However, it was at Corps - the operational level - that CB burgeoned in 1916. At first some HAGs (almost always medium guns) were dedicated to CB work, but still with no staff beyond their own acting ad hoc. Experience was gained but too low in the hierarchy - there was, for instance, no special access to the RFC - and only erratically.³⁸ Special staffs were improvised, eventually to be approved and increased. Finally, the appearance of new weapons like the Tank required direction from above on how to integrate them. Thinking on tanks came through GHQ, but was largely a product of Ernest Swinton's proposals. In considering tanks weaknesses he put his finger on German artillery, and wanted more British CB effort.³⁹ He got this support because it was the purpose of the artillery to support others as they needed it; priorities were drawn up by commanders and the General Staff which the artillery then put into action.

The Somme offensive pointed out the growing need for British CB improvements, but much of the development was on quiet fronts. This is not surprising, as the inadequate staffs trying to cope with the Somme battles had little spare time for contemplation. The RFC was integrated into the flow of battle - not just pre-arranged shoots - via the system of 'zone calls'. These allowed un-engaged artillery to fire on opportunity targets and were pioneered by Second Army

³⁵ OH1916v2, p171.

³⁶ I ANZAC Corps upheld the Australian reputation for not suffering paperwork gladly: WO95/992. See II Corps BGRA diary (WO95/651), 24-7/7 16 for an indication of the changes Uniacke forced.

³⁷ Later Uniacke relaxed his paperwork demands; he clearly realised the need to get the artillery working methodically rather than just enjoying forms.

³⁸ Rawlins, *History*, p108.

³⁹ CB remained a high priority for tanks: SS164 'Notes on the use of tanks...', 5/1917.

in the quiet Ypres Salient.⁴⁰ Further, on quiet sectors the goal was destruction of German guns, not just neutralisation at the crisis of an attack. Accuracy with all the technical components of gunnery was the goal, since the shell had to be close enough to at least damage well-protected (sometimes concrete covered) German guns. The benefits of adjusting for meteorological variation, charge temperatures, gun wear and other variables were thus greater on quiet sectors. With ammunition scarcer thanks to battles having priority, accuracy was needed for economy.

Experience was distilled to rules of thumb, by which 100 rounds of 6" howitzer, 80 rounds of 8" howitzer or 60 rounds of 9.2" howitzer fire were necessary to destroy one German gun-pit. On top of this some medium-gun shrapnel was mixed in to cause personnel casualties. In active areas there was enough ammunition and accuracy was marginally less useful when the mission was area saturation to suppress German fire. Also, when trying for destructive CB the British employed heavy howitzers, not just medium guns. This avoided the error common during the Somme of relying purely on guns for all CB work. Later in the Somme this artificial and harmful distinction of CB guns vs. bombardment howitzers faded, allowing each to be used as situations demanded.

With the restraints of a quiet sector, Sound Ranging, the cross-referencing of the sound waves of gun discharges to determine its location, was developed under Third Army, south of Arras. Perhaps too much should not be made of this, for some methods that worked on quiet fronts were technically unsuitable for active ones. Sound Ranging in particular was nearly useless if too many guns were firing at once, and required lulls in friendly firing. These accommodations were unlikely to have been granted in the middle of a battle by Army commanders merely to allow scientists to experiment on new kit. Third Army was also a leader in producing a consolidated map at Army level of all active German batteries, updated regularly. During the war maps became vastly important. First new, accurate maps were needed which then had to be updated. While GHQ had started with the only topographical section, by 1915 each army had one and in 1917 each Corps received one.⁴¹ Another service that spread from Army to Corps was survey. At first not thought to be of much use for guns in the field, by 1917 it was a key to the new tactics. Survey Sections were given to Corps and by 1918 they were even divided amongst divisions, with semi-trained artillery personnel helping, so important was it.⁴²

One great benefit of the quiet sectors of front in 1916 was the time it gave for training the New Army and Territorial Force gunners. Yet it also allowed some Corps to develop

⁴⁰ No2 HARG diary (WO95/87), 14 or 16/6/15.

⁴¹ Gnffith, Battle Tactics, pp154-5.

⁴² After the war survey would become an RA function instead of RE.

tremendous local knowledge. Since many British Corps occupied their front for a considerable time, they became experts on the geography, German actions and reactions and local minutiae. This knowledge could be exploited once conditions changed. In at least one case a Corps CB office stayed on to oversee CB under the relieving Corps to pass on this experience.⁴³ On the other hand, changing a Corps' boundaries - or moving to another sector - could disrupt artillery efforts, so dependant on local experience and close RFC liaison, with RFC artillery-spotting squadrons were attached to Corps.⁴⁴ So that conditions did not get too ossified and the Germans too complacent, many Armies kept a certain amount of artillery as a 'travelling circus'. Corps would be reinforced in rotation to take exploit German weaknesses and patterns. This also fostered and demanded Corps planning ahead, plans that could serve as the basis for larger offensives. X Corps was perhaps the best example: after their 500th CB shoot in the same area they wrote a report on all the changes that had taken place in the past ten months and their import.⁴⁵ Sometimes divisions were to plan ahead for the arrival of a whole Corps on their front, as at Vimy Ridge.⁴⁶

On 1 January 1917 CB operations took a step forward. In December 1916 GHQ had recognised that 'good organisation' was the main contributing factor to CB efficiency.⁴⁷ A Counter-Battery Staff Officer - colloquially the 'counter blaster' - was authorised for each Corps 'owing to the importance of an efficient counter-battery system, as demonstrated in the SOMME battle'.⁴⁸ Just as important, he was granted an adequate staff of an orderly officer and clerks.⁴⁹ Technically independent of the CHA, whose guns he used, the CBSO came directly under the Corps GOCRA/BGRA, but generally relations were close.⁵⁰ Quite naturally the Artillery Intelligence office was in constant touch. Some CBSOs had executive control

⁴³ XVIII Corps during Passchendaele; XVIII Corps diary (WO95 955), 10/1917.

⁴⁴ II Corps CHA diary (WO95/654), 9/1916.

⁴⁵ X Corps BGRA diary (WO95/863), 28/9/17.

⁴⁶ Bailey, Field Artillery, p139n28.

⁴⁷ SS131, 'Co-operation of Aircraft with Artillery', 12/1916 edition.

⁴⁸ OB/1911 of 17/12/1916. Technically CBSO was just the common term, and the official term was 'Lt. Col., RA, attached for Counter Battery Work': RA Nomenclature Committee, Horne Papers, IWM.

⁴⁹ An ADC was authorised, raising the CB staff to three officers. 121 Staff/4903 of 25/2/1918. Experience showed a staff needed reinforcement to handle a large battle, perhaps doubling. 'Artillery Experiences in Messines Battle, IX Corps'. (WO95/841)

⁵⁰ Canadian Corps changed this arrangement practically but not officially in 1918, with the CBSO coming under the CHA. The modified system was adopted by the British after the war and lasted through WW2. Nicholson, Gunnery of Canada, p367.

over CB groups, a trend that rapidly grew.⁵¹ Whether or not he had control over guns, the CBSO was certainly responsible for their tactical employment.⁵² Liaison with the Corps RFC squadron was intimate, with a CB representative posted to squadron HQ. Aerial observation produced about 30% of CB information in trench warfare and a much greater amount in mobile operations. Aerial photographs were even more important, as these provided the precise information needed for destructive shoots and of course for maps. Photos could be processed in as little as six hours, but reliably within twenty-four. Each Corps also had Flash Spotting and Sound Ranging units which could provide prompt information pinpointing to 5-25 yards. FS was quite mobile, taking only a few hours to set up their posts but SR units needed 36-48 hours and so were little use under mobile conditions. Kite Balloons were available in suitable conditions and provided steadier information than the RFC. However, the increase in long-range guns through the war drove balloons further back behind the line, limiting their utility. Sometimes CBSOs would give SR or FS units a 'direct call' on a battery to speed responses, when time was critical. These batteries, typically heavy howitzers, would have other duties, but would await the discovery of a good target by their spotters and promptly engage it. Liaison with the infantry was also a useful source of intelligence, in mobile operations second only to aerial observation. CBSOs were in a position to amalgamate information from these varied sources, prioritise it and order the response.⁵³ This significantly shortened the decision-making cycle and thus response times. It must be admitted this is a somewhat idealised picture; at least one CBSO used a ouija board to select targets.⁵⁴

Yet for all his resources and good work, the CBSO was a subordinate, executive officer. He was allowed a set number of guns to perform a set task. But others defined the parameters and often the policy. CBSOs would be consulted about what should be done and the best way to go about doing so, but once matters were decided at a higher level they did the work demanded by others. The discovery by the rest of the army of the importance of CB work sometimes tended to obscure other artillery work but CBSOs were sufficiently junior that by the time orders reached them there was nothing to do but obey.

⁵¹ Canadian Corps probably pioneered this development; 'Notes on Counter Battery Work in connection with the Capture of the Vimy Ridge by the Canadian Corps on April 9th 1917', WO/95/1059, ¶4. (hereafter, 'Canadian CB at Vimy') LtCol AF Brooke was staff officer to GOCRA Canadian Corps from the end of 1916 until the Armistice.

⁵² AGL McNaughton 'Counter Battery Work', *Canadian Defence Quarterly*, 3:4 (1926), p15, from which this section largely draws. McNaughton was first CBSO and then CHA of Canadian Corps. After becoming CHA he kept much CB authority during mobile operations, but in trench warfare he left it to the CBSO, Major HDG Crerar.

⁵³ Rawlins, *History*, pp19-20; Bailey, *Field Artillery*, p62 and n62.

⁵⁴ HH Hemming Papers, IWM.

Just when CBSOs were authorised, GHQ was addressing the whole issue of handling the artillery. CB was one of the areas re-considered and the new policy was a sound one that would last the rest of the war:

Counter-battery work is not a matter of spasmodic effort, but is a continuous operation depending for success on accuracy of fire, continuity of plan, unremitting study and firm control. Its conduct on these lines will alone meet the end in view, namely, the considerable if not total reduction at decisive moments of the volume of hostile artillery fire...⁵⁵

However, this active policy could be over-ruled locally if there was pressing reason. XV Corps planned the coastal operations that were to have formed part of the 1917 Flanders campaign. The Germans had the edge in guns; Rawlinson's first step after being given command of the operation was to ring his MGRA on leave and set him to examining the CB situation.⁵⁶ After taking over from the Belgians the British tried the usual measures. Losses were heavy and results poor. They then dropped the aggressive policy until an attack was to be launched. Calculations were done on how much time and how many guns would be needed to gain the upper hand, but the plans were never tried because the resources were called for elsewhere.⁵⁷

The British had a significant technical edge in counter-battery work over the Germans. Technology evolved rapidly for both sides but the British developed an advantage in Sound Ranging.⁵⁸ The Germans never advanced beyond ear-trumpets to determine rough bearings, when British equipment was accurate to 25 yards in good conditions. German radio developments were slightly behind the British but this was seldom a great handicap, for the Germans were generally falling back along their communications while the British were advancing away from their telephones. It is sometimes represented that the Germans led in gun calibration, which they made great use of in the March 1918 offensive. However, the British had been calibrating for several months before the Battle of Cambrai and afterwards expanded their calibration facilities, also developing a more sophisticated method.⁵⁹ There was no great edge in the aerial battles until the last days of the war. Both sides provided air and balloon squadrons at Corps level. The Germans periodically had the upper hand in aircraft technology, but even then the British stoically accepted the casualties and kept their artillery observers

⁵⁵ SS139 3, 1/1917.

⁵⁶ Rawlinson diary, 25/5/17.

⁵⁷ XV Corps diary (WO95/925), 8-9 1917.

⁵⁸ SS580 '... what can be done by our Batteries to avoid detection by enemy Sound Ranging', 14/9/17.

⁵⁹ III Corps BGRA diary (WO95 692), 29 6/17; II ANZAC Corps CHA diary (WO95/1034) section on Loring's Group, late 12/1916 or early 1/1917; Canadian Corps GOCRA diary (WO95/1059), 8/1918.

flying. Germans adopted and produced more medium calibre guns, thus increasing the average range of their artillery. On balance the British had a small technological edge, but it was not so significant as their organisational edge.

In organisation the BEF had another advantage over the Germans, who never adopted Corps as the main level of artillery command, using Divisions and Armies. A Division would have the minimum amount of artillery judged necessary to hold its sector, reinforced as needed. But divisional groups were too small to have decisive effect and there were too many of them. Guns would not fire if an attack was not on their front, while British Corps could switch fire to cover threatened areas. German divisions did tend to occupy sectors for a considerable time but they lacking specialist CB officers, opportunities were frequently wasted showing Germanic efficiency and thoroughness was not ubiquitous.

Of course the Germans were not always trying to do what the British were. They were not always keeping the front active. Defending, they only wanted to disrupt the co-ordination of British infantry and artillery so the infantry would be vulnerable. This did not require such elaborate or centralised control as attacking: if one division held out, it would flank two others, slowing the whole attack. It was during long engagements such as the Somme, Arras or Passchendaele that German CB weaknesses told most. At Passchendaele they had considerable advantages and might have made an offensive untenable if better handled. Also the lack of centralised CB was a liability when the Germans did attack. Even in 1918 their neutralisation techniques were not as good as British ones in 1917 nor was their artillery intelligence as developed.

The Arras/Vimy Ridge offensive in April and May 1917 was the first time CB played a key role in pre-battle plans. The importance of artillery to the German defence was well understood; consequently there was great concern the Germans would be able to fire an effective counter-preparation on the British trenches before Zero, disrupting the entire attack.⁶⁰ Such an importance was attached to this that it was one of Birch's main concerns in doubting Third Army's plans. In itself this is a marker of how much importance the artillery gave to their mission of supporting the combat arms: everything that could be done must be done, even if that ruled out other attractive options. Third Army had a considerable reputation for developing new technology - they had been at the forefront of sound ranging, mapping and flash spotting - and Holland was confident in his plans, not least because he counted on attacking before the Germans reinforced their artillery. He was also confident that any reinforcing guns would be detected and then dealt with, confident to the point of putting his own head in a noose. In a fit of temper at GHQ's conservatism he offered to stand in the Grand Place of Arras standing on a

⁶⁰ OH1917v1, pp201-2.

chair in that posture, the chair to be kicked out when the first German shells interrupted traffic in town.⁶¹

Third Army's plan was not adopted but the same methods were employed for GHQ's revision. Following the updated ideas on how to attack - as developed after the Somme - the RA developed a thorough and intelligent plan to deal with the German guns as was most convenient.⁶² Some guns were earmarked for CB only, but these could be reinforced by others switched from the bombardment; the converse was not true. Isolated German batteries would be engaged first and destroyed. Then, nearer Z Day, concentrated groups of German batteries would be dealt with but to a lesser degree.⁶³ By now the problem of unlocated German batteries was held to be greater than undestroyed batteries, so tactics had changed. Concentrations of guns were also prime candidates for neutralisation by gas shelling; gas and HE were both heavily used. Finally it was realised that some German guns would survive no matter how thorough the British preparation. Surviving German guns would be even less of a threat with their OPs and communications destroyed. OPs, telephone exchanges, supply dumps and HQs were the final bombardment targets in the Arras plans. With them destroyed, blinded or interdicted the German counter-barrage did not hamper the British advance. All this was part of an 'unprecedented' CB plan, thoroughly integrated into the main bombardment programme, again reinforced by bombardment guns at Zero Hour, and during the whole of the attack.⁶⁴ So thorough was it that extra officers and clerks had to be drafted in to CB offices.⁶⁵

However, in the later stages of the offensive some of the critical elements so successful on the first few days were lacking. British guns were thinner on the ground, through trouble advancing through the mud, but intelligence was the greatest weakness. The RA did not know where German guns were and hence could neither destroy nor neutralise them.⁶⁶ Despite the improvements made in the past months, CB in the later stages of Arras resembled that in the

⁶¹ Allenby Papers, LHC, 6/VII/7.

⁶² see SS135, 'Instructions for the Training of Divisions for Offensive Action', (12/1916) which discussed bombardment, barrages and CB.

⁶³ OH1917v1, p313.

⁶⁴ OH1917v1, p312. See also OH1917 Appendices, pp44-51, 52-8.

⁶⁵ Rawlins, History, pp117-9; 'Canadian CB at Vimy' ¶6.

⁶⁶ Liaison might fail, as when batteries were firing in view of British infantry. OH1717v1, p382.

Somme. After the battle some units produced reports on their staff methods.⁶⁷ It is not clear who these were for, nor do they seem to have been widely circulated.⁶⁸

The attack on the Messines-Wytschaete Ridge was perhaps the acme of destructive CB in 1917. Objectives were limited beforehand and stayed that way, unlike at Arras when the attack was prolonged to cover the failure of the French offensive. Thus there were plenty of guns to deal with a restricted area. The objectives were also chosen with regard to German gun positions, integrating the two arms in a way rare for more ambitious attacks.⁶⁹ Further, the Corps occupying that sector had been there for a considerable time and knew German gun positions and their patterns of employment. Roughly 30% of the pieces available were allotted to CB work, which was continuous, methodical and successful. A new formula was used, with German guns on the main front of attack being neutralised one for one; on the flanks it was 1:4.⁷⁰ While part of this is just for planning convenience, it shows organised thinking that would allow rapid planning. If these ratios later proved generous or scant they could be adjusted, but having them as guidelines was more productive than the empirical methods used earlier. The final two days of the preliminary bombardment had all guns on CB work. On the whole, there were a record number of destructive CB shoots in the preparations to Messines.⁷¹ Corps on the flanks were brought in to provide more efficient flanking fire behind the main ridge. During the assault they also fired on any German guns in their sectors that could enfilade the attackers similarly providing a record number of neutralisations on Z Day.

GHQ continued its great emphasis on CB work in this battle, intervening in Second Army's plans several times. First they suggested more guns should be used, but they also checked how they were to be used, Haig himself delving into each Corps' plans. Birch also looked over the plans and found one Corps starting their plans with trench destruction, any leftover guns to be used for CB: 'This negation of all modern artillery thought appalled me'.⁷² Birch strove to see that the infantry were protected however possible from German artillery

⁶⁷ 'Canadian CB at Vimy' as one very thorough example.

⁶⁸ Brooke sent the Canadian report to X Corps who based their Messines plans on it. HW Wynter, 'The Revival of the Barrage', *JRA*, v70, no4 (1943), p272. Wynter was then with X Corps.

⁶⁹ Rawlins, *History*, p124, quotes a semi-official letter from the Chief Staff Officer of Second Army to Operations Section, GHQ: 'We must get those bally guns behind the Messines-Wytschaete Ridge, and we must get them at once...!'

⁷⁰ X Corps BGRA diary (WO95/864), 4/1917; GHQ took direct interest in seeing CB on the flanks: Rawlins, *History*, p126.

⁷¹ *Ibid.*, p131; the record would shortly be bettered during Passchendaele.

⁷² Haig Diary 26/5/17- 4/6/17; Birch quoted in Anstey galley proofs p193.

fire, even to suggesting that the mines labouriously excavated under Messines Ridge be exploded before Zero Hour, simply to simulate the assault and provoke the German guns to fire. Birch bent Haig's ear and it was up to Plumer to defuse the idea, largely by proposing the last two days of the preparatory bombardment be given over entirely to CB work.⁷³ The matter was so important that there was a high-level conference, at which Birch spoke solely as a technical expert. However, he had won his point that CB was the main thrust of the bombardment, with only 'a sufficiency' of guns for what had been the key element of the previous year's bombardments, trench destruction.⁷⁴

Messines Ridge was a prelude to the Third Battle of Ypres which did not, however, begin immediately. The detailed orders took some time to work out, but the day after Messines Ridge was taken Fifth Army issued preliminary orders stressing the importance of mastering the German artillery.⁷⁵ A prolonged bombardment, including the fiercest CB struggle of the War took several weeks before the way was ready for the infantry. It took so long because the Germans now realised how much they needed to win the CB struggle. If they could do so the British attack would either be delayed or savaged.

To start with the BEF allotted alternate days to CB work and trench bombardment; the last two days were entirely devoted to CB work, as at Messines.⁷⁶ Ammunition expenditure was vast, with II Corps - not even in the main attack - using up to 26,000 rounds per day just for CB; bombardment and harassing fire were extra.⁷⁷ Preliminary firing was to destroy German guns, while just before the attack their positions were to be drenched in gas; any batteries still firing at Zero would earn even more fire.⁷⁸ There was great difficulty in the early stages for the Germans had been allowed several years to build and fortify their gun positions. There were so many of them there was trouble determining which were actually occupied and the criteria for success had to be made destroyed gun-pits.⁷⁹ One innovation was to churn the area around pits so ammunition would be destroyed and re-supply hampered; this was a joining

⁷³ GHQ to Second Army 29 5/17 and conference 30/5/17, WO158/215.

⁷⁴ Birch to Harington, 16/5/17 in Anstey Papers.

⁷⁵ *Ibid.*, p135.

⁷⁶ OH1917v2, pp43, 47.

⁷⁷ This is heavy artillery ammunition; field guns would be firing still more. II Corps CHA diary (WO95 656), 8/17.

⁷⁸ OH1917v2, p49 and n1.

⁷⁹ OH1917v2, p136.

of the CB and harassing missions.⁸⁰ Despite these handicaps, the very real physical advantages the Germans had and stout efforts by German gunners, the RA gradually established fire superiority over much of the attack area. By Z Day, the main German artillery group had lost one-quarter of its field guns and half its heavies, but the Germans just pulled their guns back and replaced their losses.⁸¹ However, the attack was poorly conceived and pressed too far. On these grounds the Ypres Salient was not a good place to attack, despite its strategic location.

Despite mixed opening success, the attack was pressed and CB grew in importance. The German fixed defences were gradually shattered, which left them only artillery fire and infantry counter-attacks.⁸² The BEF acted flexibly at different times, sometimes pulling guns off CB and using them on a protective barrage when that was more important. The guns were still available for CB, but there was no point in continuing neutralisation if the target was already quiet.⁸³ This flexibility shows Birch and GHQ were not monomaniacs for CB, but were adjusting artillery fire to offer the best possible support of the infantry. Thanks to the prolonged fighting, destructive CB naturally took on a higher profile, at times accorded half the guns. It was carefully co-ordinated with the rest of the artillery fire, and an elaborate variety of deceptive measures taken. Creeping barrages were fired exactly as they might be to cover an attack; when German batteries responded on their SOS lines, British CB staffs noted new targets.⁸⁴ These could be engaged immediately, or a more important time in future. Attack frontages were disguised by not limiting CB to the attack sector, which also bore fruit by limiting German enfilade fire and helping prepare the way for future attacks.⁸⁵ Several times during the battle the Germans changed their tactics, but alert and intelligent British staff officers and commanders soon caught up, and at times anticipated German changes.⁸⁶ But in the end the CB problem was decided as much by weight of fire as by how cleverly it was applied. As long as the weather held fair, ammunition and guns could be moved up to support attacks.⁸⁷ When the rains came this was impossible and progress slackened and casualties mounted in direct proportion. The subordination of artillery to other arms is borne out by the choice of

⁸⁰ Rawlins, *History*, p135; I ANZAC Corps BGRA diary (WO95/994), 11/9/17.

⁸¹ *OH1917v2*, p93, p138n1.

⁸² *Ibid.*, pp300-1.

⁸³ CB was still the main priority until Z+15, when the infantry were at their most vulnerable. Bailey, *Field Artillery*, p140n32 ; Rawlins, *History*, p128

⁸⁴ X Corps BGRA diary (WO95/864), 3/9 17.

⁸⁵ *OH1917v2*, p184.

⁸⁶ Rawlins, *History*, pp146-50.

⁸⁷ *OH1917v2*, p348n1.

Flanders as the theatre of action. Gunners did what they could to ease the burden on the infantry but could not do everything. Several times the exhaustion of gun detachments threatened the advance, because whereas infantry was rotated through Flanders there was not sufficient artillery to allow adequate rest. When the matter was raised with Haig he acknowledged the problem but insisted the offensive continue because other matters were more important.

In contrast to the immense bludgeoning CB effort at Third Ypres, the next British attack was with a rapier. The Battle of Cambrai saw an entirely different emphasis, made possible by the presence of tanks. These dealt with the German barbed wire, permitting a surprise attack.⁸⁸ Now there would be no reinforcing guns or troops, and no preliminary bombardment was necessary. CB was entirely to neutralise the German guns, and then only until friendly troops got close enough to bring the German guns under direct fire. The German division on the main attack front had only thirty-four guns in support. The British also implemented new methods for accurate shooting, but also made the most of thorough planning.⁸⁹ Of the 1003 guns available, two-thirds would be devoted to CB on the day of the attack - a ratio that became standard whenever the BEF was able to launch a surprise attack. As before, the German guns would not be the sole target for neutralisation. OPs would be blinded with smoke screens, HQs and telephone exchanges would be attacked.⁹⁰ Batteries themselves would receive a mix of HE and gas calculated to reduce efficiency if they did fire at all. Special provision was made regarding German AT guns, which would be shelled for five minutes once spotted.⁹¹ After an excellent break-in, progress slowed and the success of the German counter-attack on 30 November was largely due to bad British CB intelligence. Poor weather had kept the RFC down, while Sound Ranging and Flash Spotting networks had not yet been re-established on the captured ground.⁹² The net results were good, particularly from the artillery perspective. The major new concept, predicted fire, had been proven and would become the norm in 1918. Secrecy had been preserved, and the same steps repeated while some aspects that were wanting (such as too-short smoke barrages) could be improved.⁹³

⁸⁸ OH1917v3, pp10-12.

⁸⁹ The most important new method was predicted fire which not exactly new, but this was the first time it was used on a large scale.

⁹⁰ OH1917v3, pp326, 27.

⁹¹ IV Corps BGRA diary (WO95/729), 18/11/17.

⁹² OH1917v3, p332.

⁹³ Ibid., pp286-7, 333.

Again in 1917 there was progress in CB on the quiet sectors of the British front. Now, however, this was less marked since the basic methods had been decided and a framework established. Even in the midst of major battles, daily and weekly reports were being produced; in fact they were even more important in rapidly changing situations. The level of Army and GHQ attention to CB rose as it became clear how necessary it was to win battles. But interference from above declined as Corps staffs became more proficient and proved this daily. Instead of distracting visits by Generals, front-line experience was solicited and distributed in a stream of informational pamphlets. However, they may have received less attention in 1917 when most units already had their own way of doing things. There were two main areas where information still came top-down. Gas warfare was one and various new technical improvements the other. With new kinds of gas constantly being introduced there was a stream of pamphlets on how to use it.⁹⁴ Information included how many shells were necessary to cover a given area and various tactical schemes to maximise effectiveness. In the 1918 editions the tactical ideas were ever more vicious, more cunning, clearly the product of experience.⁹⁵ Smoke was another new munition for which the artillery needed instructions. A variety of pamphlets were produced dealing purely with smoke and others contemplated how smoke would change tactical questions.⁹⁶

Technical efficiency was also something that had to be taught not only to the New Armies and Territorial gunners but to the RFA, which had disdained it before the war. While basic standards were rising, new methods were being spread, the most important calibration and survey. These were the keys to surprise at Cambrai and it was realised that they could be repeated if units were properly trained. New tactical methods appeared such as the 'one round shoot' whereby guns in range fired one round on a given target. Either a brigade would fire, or all Corps guns might fire.⁹⁷ This was a model of efficient communications and staff-work, and could be devastatingly effective.⁹⁸ It is noteworthy that the concerns for Cambrai had centred on the predicted barrage, rather than on predicted CB work, which had already been proven in the quiet sectors. One important way expertise was shared was by loans. Often Corps at rest would send their staff officers to other Corps engaged in battle to help with the

⁹⁴ eg SS158 '... Recent Operations on the Front of First, Third, Fourth and Fifth Armies', 5 & 7 17.

⁹⁵ see SS134 '... the use of Lethal and Lachrymatory Shells and Bombs', 12/16, 8(?) /17, and 3/18.

⁹⁶ eg SS175 '... the use of Smoke'; SS214 'Tanks and their employment...'; SS135 'The Division in Attack' (1 & 11/18 eds.)

⁹⁷ XVII Corps BGRA diary (WO95/955), 8/1917.

⁹⁸ On occasion it was actually over-used: I Corps BGRA diary (WO95/619), 6 & 7 1917.

extra work.⁹⁹ Also, courses were available for staff officers and there was often a rotation of junior officers from brigades to Corps HQ to keep both fresh.¹⁰⁰

The lull of the 1917-18 winter saw the British adopt the defensive on a large scale for the first time.¹⁰¹ This had little effect on CB work; it still had a relatively high priority. Indeed, periodic heavy CB shoots, bombardments of German trenches and raids were the only aggressive action. This was silent acknowledgement the CBSO system was working.¹⁰² Yet the infantry building front-line defences had a higher priority and it was decided not to provoke the Germans where British defences were weak and working parties would be exposed.¹⁰³ This was a decision for formation commanders, and they could take it knowing what results the artillery would produce with deliberate CB and weigh that against other considerations.

Thinly held areas, like that of Fifth Army around the Somme, were even more reliant upon their artillery than more heavily manned areas near Ypres and Arras.¹⁰⁴ However, in this area there were problems beyond the paucity of troops. When the area was taken over from the French the defences were in poor shape and a silent policy was adopted.¹⁰⁵ This prevented any firing at all until the Germans realised the French had been relieved. It was intended to begin widespread CB work once German offensive preparations became clear, but there was not enough British artillery to make a significant difference. One important possibility opened up by full-time CBSOs was analysis of how best to conduct CB. They ordinarily collected data and evaluated it; now they often provided intelligence instead of receiving it. With the Germans holding the initiative, intelligence regarding their intentions was at a premium and CBSOs produced useful material. If German guns fired mainly from distant positions and engaged in harassment, it indicated defensive intentions, or a possible withdrawal. Damaging roads, building alternate positions in greater depth and inadvertent damage to their own roads not being repaired were other signs. However, if more guns were present, repairing damage inflicted on junctions or bridges, or new forward gun positions indicated an attack. Similarly, the German never entirely left off registering their guns, nor did they go as far as the British to

⁹⁹ IV Corps noted in November 1916 'Staff on loan to HA 2nd Corps. HQHA 4th Corps still theoretically resting...' and II ANZAC helped I ANZAC in September 1917. WO95/728 & WO95 994

¹⁰⁰ This was true even for experienced officers. XV Corps BGRA diary (WO95/925), 7 2/18.

¹⁰¹ see Bailey, *Field Artillery*, pp145-8.

¹⁰² SS131 revised edition, 12/1917.

¹⁰³ eg ANZAC Corps BGRA diary (WO95 995), 3 2/18.

¹⁰⁴ OH1918v1, p125.

¹⁰⁵ III Corps BGRA diary (WO95/694), 26/1 18.

maintain a constant rate of fire, two measures to disguise preparations. Thus, less German shelling could be an indication of an impending attack. This, together with the high profile of CB in ordinary trench warfare meant CBSOs gaining responsibility over the winter 1917-18.

With the German assault launched on 21 March the elaborate CB infrastructure broke down. Communications failed, the RFC was driven back, Sound Ranging and Flash Spotting were disrupted, HQs were moving, the Germans were pushing through and there were more important targets for British artillery. Rapidly the heavy guns were either captured by the Germans, evacuated by the British or dispersed among the infantry divisions. Whatever happened to them, CB work beyond firing at an observed German battery became impossible. Poor liaison with the RFC was perhaps the key, since it deprived HQs of information; brigades would have been able to fire since they had their own wireless sets, but the organisation had fallen apart.¹⁰⁶

The April offensive around Ypres and the Lys saw much the same situation. Once the static front changed, different methods had to be adopted. Heavy guns were parcelled out to divisions which ended any chance for more integrated artillery use.¹⁰⁷ Yet it was important that the infantry have support, even if that was not theoretically the most efficient use of guns. Some formations, like XV Corps, firmly resisted this dispersion. They found concentrated CB and counter-preparation far more effective when using the whole of Corps resources than with just a reinforced Divisional artillery.¹⁰⁸ Still, they could only do so only as long as their front held, because once they had to move, communications - which permitted fire to be concentrated from dispersed guns - failed. Both policies had points in their favour and retaining guns under Corps control was preferable, but clearly it was not always possible. Once the action did become mobile, it became 'disastrous' to try and rely upon central control: orders would arrive late if at all and direct fire again became useful.¹⁰⁹

The objectives for CB also had to be re-evaluated. In trench warfare destructive CB was the policy, plus neutralising active German guns.¹¹⁰ For surprise attacks the BEF now emphasised neutralisation. However, it was found neutralisation did not work in defence. German gunners still fired despite the best efforts of the RA and the Germans had such a

¹⁰⁶ see 'Notes on Recent Fighting No.5 - Artillery' (4/1918). CBSOs were urged to stay with Corps HQ, since it should be near the aerodromes.

¹⁰⁷ OH1918v2, p95.

¹⁰⁸ XV Corps BGRA diary (WO95/925), 16/4/18.

¹⁰⁹ OH1918v2, pp293, 521, 523-4.

¹¹⁰ This was the general policy adopted after the war. RW MacLeod, 'Some Notes on Counter-Battery Work with Divisional Artillery', JRA 63:1 (1936) pp12-32.

preponderance of guns they could ignore a few firing at a reduced rate. GHQ rapidly switched policies across the BEF. Now rather than seeking to slow the whole attack, overwhelming fire was concentrated on one sector.¹¹¹ This was destructive fire in the defense, a change to all tradition and experience, and one that could only be made with a highly centralised command structure.

Once the weight of German attacks was switched from the British to the French front this remained the major defensive policy. CB was to be continuous, again an artillery duel destroying any German guns detected. Yet it could only be an artillery duel because there were no more important targets, because the infantry did not need immediate support. If an assault was expected, concentrations were fired on narrow sectors, again to destroy guns and especially personnel. This was adhered to in the lull between May and the resumption of major Allied attacks in August.¹¹²

The British front did not stagnate in the lull. Local attacks pushed the Germans out of important positions and raids kept things from getting too quiet. The small operations fit well with the new CB policy and when something bigger was attempted the only thing required was more guns. Surprise, as at Cambrai, was a precondition for several such attacks, and CB assumed a similar priority because the German artillery was such a high proportion of their defensive firepower. For example, at Hamel on 4 July two-thirds of heavy artillery was used for CB, and none of it had been allowed to register targets, to safeguard surprise.¹¹³

The Battle of Amiens (8 August) opened the series of inter-related offensives that broke the German army and led to the Armistice. CB was handled nearly identically to Cambrai, although there was more concern about German counter-preparation. Reinforcing guns were to be silent until the last night; even then their only fire would be in case the Germans opened fire having detected the impending British assault.¹¹⁴ Interestingly, this was delegated to the CBSO, another acknowledgement of his growing role as a commander, one with crucial but limited responsibilities.¹¹⁵

The results were impressive: some German batteries were found abandoned, with

¹¹¹ XIII Corps BGRA diary (WO95 902), 20/7/18.

¹¹² V Corps BGRA diary (WO95/756), 12/7/18; XIX Corps BGRA diary (WO95/968), 29/6/18.

¹¹³ SS218, 'Operations by the Australian Corps against Hamel ...', 7 1918.

¹¹⁴ OH1918v4, pp17, 23.

¹¹⁵ *ibid.*, pp26-7. This may have been peculiar to the Canadian Corps who called their senior gunner GOCRA, and the CBSO was instead the Counter-Battery Officer. After the war, CBO became standard. Nicholson, *Gunnery of Canada*, pp242, 367; Anon., 'The Organization of Counter-Battery Work in Mobile Warfare by a Medium Brigade Allotted to a Division', *JRA* 63:2 (1936), pp171-6.

muzzle-caps still in place after the Germans fled.¹¹⁶ British infantry took few casualties from German shell-fire as they advanced: the German artillery was largely out of action.¹¹⁷ During the day many opportunity targets were engaged, German batteries and AT guns being high priorities; some batteries were found abandoned with all their horses killed as they tried to move. The advance was continued, although within forty-eight hours of the start of the battle CB was much less effective since intelligence and communications were worse. Most CB shoots for the rest of the battle were zone-calls, which were obviously less satisfactory as fewer guns would fire.¹¹⁸ It was not certain German batteries would be spotted, and they might well have fired effectively before the British could respond. Communications, especially by wire, promptly failed and there were cases where Corps HQs were better informed than their subordinates closer to the action.¹¹⁹

Some of these aspects were repeated in later actions, although tanks were rarer. Precisely because they were rarer great care was paid to suppressing German anti-tank gun fire. Aeroplanes were told off specially to search for AT guns, each with a 60pr battery waiting so the AT gun could be engaged immediately and overwhelmingly.¹²⁰ CB was effective at the opening of an attack, but as artillery co-ordination declined, infantry penetration waned on the succeeding days. It was generally only necessary to suppress the German artillery long enough to let the British infantry into the German defensive position; thereafter they could work forward themselves against German infantry whose morale was crumbling.¹²¹ Typically 50-70% of available heavy artillery was under the CBSO, with only a minority bombarding in support of the infantry. The CBSO first directed CB, then turned to harassing German communications against reinforcing or retreating troops.¹²² This was the peak of responsibility for CBSOs, who now generally had autonomy over CB and the bulk of harassing fire.¹²³ In mobile operations it was generally impossible to get Sound Ranging or Flash Spotting units into action, which intensified dependance on the RAF. Zone calls became the main source of artillery information when the Germans were not in prepared positions, and

¹¹⁶ *Ibid.*, p47.

¹¹⁷ Director of Medical Services, Fourth Army, quoted in Rawlins, *History*, p220.

¹¹⁸ *OH1918v4*, p129.

¹¹⁹ Canadian Corps GOCRA diary (WO95/1060), 14/8/18.

¹²⁰ IV Corps BGRA diary (WO95/730), 19 8/18.

¹²¹ *OH1918v4*, pp184, 222; *OH1918v5*, p33.

¹²² *OH1918v4*, p264.

¹²³ Canadian Corps delegated even more. As attack turned into exploitation, some RGA was devolved from Corps to divisions but if more help was needed, the CBO was responsible. *OH1918v5*, pp636-7.

the RA benefitted greatly from the rapid decline of the German air services. Still, with vastly more mobile operations there was great de-centralisation and often less experienced Divisional officers had to manage CB themselves.¹²⁴ They would not have had so much experience as specialist CB personnel, nor the full range of intelligence sources. Eventually it was hoped to train one officer per RGA brigade in CB operation, but the Armistice made it moot.¹²⁵

In contrast to the mobile operations, when the Germans did hold strong positions like the Hindenburg Line, they could not be pushed out without a properly-supported attack. Full bombardment plans were worked up, often on very short notice, and fired by guns coming straight off the march.¹²⁶ Despite this the latest procedures were managed, survey and resection being possible in only about forty hours.¹²⁷ CB operations were now cut-and-dried. German batteries were first cut off from resupply and prevented from moving, then destructive fire opened. From Zero Hour, any surviving guns, fixed to their ground, would be neutralised.¹²⁸ Often the interdiction and harassing programme was as detailed as the CB programme, a sign of their close interrelation. This bombardment would give the BEF fresh impetus and Divisions would follow up the breakthrough with much less artillery. Whenever the British advance faltered, Corps control of artillery was rapidly and smoothly reasserted, bringing up more guns and staff officers, and also the intelligence resources they controlled. All this would provide another impetus to get through the next German line, always providing the troops could be supplied. When they could not, formations shifted to concentrated harassing fire, destructive in itself. When Third Army was 'almost stationary' from 26 October it organised aggressive CB and harassing fire, supported by the full panoply of RAF, balloons, Sound Ranging and Flash Spotting. Second Army had to pause at the Scheldt but only enough guns were brought forward for protection against a German counter-attack and to conduct destructive CB fire.¹²⁹

Thus, CB grew from a haphazard and secondary part of artillery tactics to an organised and integrated element of the battle plan. In the early days CB was neglected because it was less

¹²⁴ Rawlins, *History*, pp224-5.

¹²⁵ *Ibid.*, p244.

¹²⁶ *OH1918v4*, pp477, 490.

¹²⁷ *OH1918v4*, p335.

¹²⁸ Mustard gas was particularly effective at interdicting German movement as their gas defences were worse than British ones. It was first available for the breaking of the Hindenburg Line.

¹²⁹ *OH1918v5*, pp391-2, 450.

important than other missions. Its value was realised once the Germans changed their defensive tactics, but effective means were lacking. The most that was possible was a brief flurry of shells to encourage the Germans to cease. Throughout the war the Germans gradually put more emphasis on defensive artillery fire, which forced the British to respond. At first neutralisation was tried, but the Germans could avoid it by pulling their guns back out of sight of the British front line. Then destruction was desired, but generally not possible. Faltering attempts were hampered by technical deficiencies but gradually these were overcome. The lack then was a co-ordinator of all the information. The appointment of CBSOs was the key step, although there had been officers in charge of CB before. Now CB had the full-time attention necessary, indeed extra help being made available to Corps in the middle of great battles. As CBSOs gained experience of the Germans in their areas they were gradually extended command of guns.

Despite being intuitively a purely artillery matter, CB involved virtually the whole of the BEF. The artillery needed help to do its best, and it never lost sight that it was fighting this 'gun duel' for a purpose, to help the attacking troops. When the attackers needed German guns dealt with, they would be; when something else was more important to them, that is what the artillery did. Gunners used every wile to obtain the best results of their fire, but never abused the quasi-independence of CB activities to do their own thing. At times they even went too far in ensuring good CB results, to the extent that the rest of the army had to rein them back.

Supporting the Attack: Barrages and Direct Fire

Artillery performs two main tasks in a battle: first making an infantry attack possible and then covering that attack. The subject of bombardments, making an attack possible, has been covered elsewhere. This chapter will examine the covering fire provided during an attack.

Before the war the British Army had no concept of a creeping barrage, or indeed any sort of linear or zonal barrage of artillery fire covering an attack. While FAT contained the germs of a creeping barrage¹ - speaking of lifting fire onto successive targets - no reader would see them without a generous portion of hindsight. During the war no one made reference to FAT in this regard, while there was a tendency to refer to it on other matters. After the war, when enquiries were made of senior gunners about the origins of the creeping barrage, no-one credited the authors of FAT. Because of its novelty there was a great interest in the paternity of the creeper and generals usually credited someone else although acolytes sometimes 'praised famous men'.²

The principle of providing covering fire is an old one. One author has traced it back to the river Somme, but in 1346 rather than 1916: Edward III's archers covered his fording the river.³ As an abstract principle, it was clearly understood by the Royal Artillery. Once the infantry had closed to assaulting distance, a few hundred yards, 'artillery fire should become frequent and intense ... the object being to demoralise the defenders and reduce the volume and effect of their fire so as to afford to the infantry the opportunity to assault'.⁴ A few practical points were added and mention was made of 'searching the rear of the [enemy] position' once the infantry charged.⁵ Crucially, however, 'no considerable amount of ammunition should be devoted to this object'.⁶ Whatever else it did, a creeping barrage required large amounts of ammunition. Furthermore, this sort of activity was not practised, not at the artillery firing camps, nor by the infantry, nor on combined manoeuvres. Few would expect it to be practised with live fire in peacetime, but if any real concept of the creeping barrage had existed it could have been

¹ §157.

² See the 1965 letters of HH Gardiner (RAI military document 509), whose enthusiasm led him to credit AF Brooke. Gardiner later retracted this claim which seems without foundation.

³ This was four days before the battle of Crecy, the first time an English army used guns in battle. AF Becke 'The Coming of the Creeping Barrage', JRA 58:1 (1931), p19. Hereafter, Becke, 'Creeping Barrage'.

⁴ FAT1914 §157, ¶2.

⁵ ¶6.

⁶ ¶6.

represented with flags. The British Army practiced a great deal with flags before the War and even during it; there would have been no more natural way to handle the concept. It should be said that no other army had a creeping barrage, all handling the situation much the same.

Instead, the preferred method of artillery support was a few batteries - as few as possible - firing on the objective until the infantry got too close for safety. This was practised, as much as it could be, and the army was comfortable with it. This method fitted well with the pre-war subdivision of Divisions, whereby each infantry brigade paired off with an artillery brigade.⁷ This was referred to colloquially - it was not officially recognised - as 'attachment' and was one step tighter than 'affiliation', a very similar practice. Where one ended and the other began was imprecise, although during the war the terms acquired firmer meanings.

Despite having no pre-war concept of a covering barrage, one was quickly developed. It was necessary for the infantry, so the artillery did what they could. Within a few months the concept was discovered and the army spent the next years improving upon it as circumstances required and permitted. Eventually the infantry became so accustomed to a superb barrage they grew over-reliant upon in and artillerymen had to argue that the infantry should do more of their own work. This did not stop the gunners from providing those splendid barrages for which the infantry clamoured, but they saw the limits it set upon success. As conditions changed rapidly in 1918 gunners changed their tactics, this time without infantry objections, actually back towards pre-war methods which had not been wrong in themselves, only wrong for trench warfare.

In 1914 the BEF fought as it had practiced, with short artillery preparations and virtually no covering fire for the last stages of the infantry assault. Much of the time this was suitable, for the Germans were in hasty defences or none at all. Nor did the RA have many other capabilities. The amount of central planning demanded for any large barrage was impossible through lack of artillery staff officers or even clerks. Communications were scant. Battle situations were often too fluid for a creeping barrage to be organised. It took eighteen to twenty-four hours to organise a barrage in 1918, and the 2/Worcesters attack at Gheluvelt would have failed had it been 'properly organised', because the Germans also would have been prepared. There were few options available beyond having a few batteries of 18prs fire as

⁷ eg in 3rd Division: 'Artillery brigades usually marched ... with the infantry brigades to which they were affiliated and under the orders of the Brigadiers of those brigades'. (WO95 1390, 3rd Division CRA, 8/14) This could have unforeseen effects, as for 15 Brigade RFA, affiliated to 14 Infantry Brigade during the retreat from Le Cateau. The infantry Brigadier's orders had been not to retreat, which led the RA brigade commander to decline another's orders to retire. CAB45 198, CF Stevens to Edmonds, nd. New Army divisions (like Maxse's 18th) could be trained this way too. Maxse Papers, f11 2.

close ahead of the infantry as they could manage.⁸ One sensible suggestion was made, combining advice from FAT and the tactical situation. John Headlam, CRA of 5th Division, suggested in mid-September 1914 that the infantry attack a key hill in the open, so the gunners could watch their progress and keep the shells just a few yards in advance.⁹ This was one of the common-sense suggestions in FAT rather than a stroke of genius on Headlam's part, but it made no difference. The infantry commanders brusquely discarded the idea, preferring to attack through woods which blinded the British artillery and the attack failed. Headlam kept plugging his plan, and beyond his there is no evidence of any sort of barrage ideas in 1914.¹⁰ There were extremely few set-piece attacks, and the late-December attack apparently had no barrage at all.

1915 saw the biggest development in infantry-support fire because it saw a conceptual change. Later years would see tremendous improvements in how a barrage was organised, but these were evolutionary, for never again did a new idea spring up.

Things did not start dramatically. The first attack of the year was at Neuve Chapelle and there was no barrage directly in front of the infantry. Shells pummelled the German trenches for a few minutes and then the guns switched to entirely different targets, neither lifting onto a second line nor lingering while the infantry charged. There were good reasons for this. In the extremely flat region observation was difficult and it would have been difficult to register on the positions of the German second line. The German second line itself was exiguous; there were only a few strongpoints and as they were not manned, British intelligence had not noticed them. Finally, while registration of the front line could be concealed by being spread over weeks, it would have been highly suspicious if the British began registering points in the second line.

There was, however, a barrage of sorts used at Neuve Chapelle. It was a barrage in the literal sense of the word, a barrier, and it was fired about 1,000 yards away from the British trenches to delay the arrival of German reserves. Ammunition was scarce and this barrage was not a high priority, but it might have mildly delayed the German reserves. The lack of the other sort of barrage, one on the German trenches just ahead of the infantry, did not lose the battle. It would have helped but would not have been decisive.

⁸ 18prs were preferred for barrages all through the war, very largely because they fired shrapnel. In 1914 FAT steered gunners towards 18prs by suggesting an increased rate of fire rather than an increased number of pieces firing. Guns with fixed ammunition can fire faster than separate-loading howitzers.

⁹ 15 9 14, WO95/1521.

¹⁰ WO95/1510 (5th Division GS) 26/12/14, WO95/1521 (5th Division CRA) 16/1 15.

After Neuve Chapelle the BEF debated where next to attack and John Headlam again suggested attacking up-hill in the open, to give gunners their best chance to 'walk' shells ahead of the infantry.¹¹ This particular attack was never made and Headlam gave up suggesting this plan. It was an intelligent method of dealing with the fluctuations of infantry combat: if one part of the attack was held up, the gunners covering that sector could see what to do, while successful infantry would not be held up by their neighbours. This idea may have harked back to some of the battles of the Boer War where the guns could support the infantry better in the open than in close terrain. However, in that war new technology (field telephones) made it possible to control indirect artillery fire.¹² In the Great War no new technology sprang forward to allow such detailed control of artillery fire. There were ceaseless efforts to improve liaison and pass information from forward infantry to the artillery, but nothing was going to solve the problem until man-portable radios were developed. Flag-waving signallers had been largely discredited in the Boer War, runners were slow and vulnerable, the wireless sets of the day were bulky and fragile, and aeroplanes had great difficulty telling hostile infantry from friendly. Next came the problem of how to adjust a barrage if some infantry were held up. This was easier in a small attack, but as attacks grew larger the complexities multiplied and commanders decided it was not worth disorganising an entire Corps attack because a single brigade or battalion was stopped. Headlam's solution was small-scale - it could only work in a few places (up-hill) and for relatively small units. For higher commanders trying to break the entire German line it was impractical. Quite likely they recognised Headlam's method as a blind alley and avoided it, trusting that something better would turn up.

For some months nobody had any bright ideas. Attacks at Aubers Ridge, Festubert and along the Rue Vert went ahead with a bombardment but no barrage.¹³ None were more than marginally successful; all were less successful than Neuve Chapelle. There was a new development in these battles, an unwelcome one. Whereas at Neuve Chapelle the bombardment was fired at the same rate throughout, from Aubers Ridge onwards during the period just before the infantry assault the artillery sped up their fire. Since the Germans were not, in fact, annihilated - nor had anyone expected they would be - all this served to do was

¹¹ WO158/200, 18/2/15.

¹² Buller's fighting around Hlangwane had what I believe is the first battlefield use of telephones to direct artillery fire.

¹³ First Army had written that the artillery were to 'support the infantry during its attack' and that shrapnel barrages should be 'expanded as the infantry advances'. However this advice was tentative and referred to protective barrages rather than supporting ones. 'General Principles for the Attack', 13 4/15, WO95/155.

give them a final warning. It became more and more necessary to cover the infantry during their advance, not just open the way.

In mid-summer a new idea popped up in a small attack for some inconsequential railway tracks near Hooze. 6th Division (of VI Corps) made a dawn attack on 16 June, in an action too small even for mention in the Official History. The artillery fired three lifts, from the front trenches to communications trenches.¹⁴ As the name suggests, the artillery fire 'lifted' from one line to the next, one hopes momentarily ahead of the advancing British infantry. Despite the new technique the attack failed, probably due to the extremely light weight of the bombardment.¹⁵ At this point it was a unique idea, perhaps developed by WLH Paget of VI Corps Artillery or G Humphreys, CRA of 6th Division. Neither left any papers or had a distinguished career in the war. Whomever we should credit, the idea was taken up by higher authorities. That it was in use only three months after the BEF's first attack (Neuve Chapelle) shows remarkably rapid adaptation to the circumstances of trench warfare.

In the late summer the BEF settled down to preparing its largest attack so far, the battle of Loos. Loos featured the most elaborate artillery plan to date and the longest bombardment. There was also development of the 'lifting' barrage in support of the attacking infantry. The 'lifting' barrage had been identified as an aid to the infantry, and was not unique to the battle of Loos, although all previous authors have identified it as such, nor have any noted 6th Division's attack in June. Lifting barrages were used the same day all along the British front, in different Corps and Armies. I and IV Corps' main attack at Loos had a lifting barrage as did the diversionary or subsidiary attacks by III, V and Indian Corps.¹⁶ Thus someone at a high level - presumably GHQ since both Armies used the same method - had spotted the new idea and supported it. Whoever became patron of the idea, there was no publicity, which emphasises that it was a practical matter rather than one requiring profound adjustment of the BEF's fighting style. Second Army ordered all their Corps to use a lifting barrage, while First Army apparently achieved the same results verbally.¹⁷

¹⁴ WO95/1581 (6th Division GS), WO95/1588 (6th Division CRA).

¹⁵ *Ibid.*

¹⁶ OH1915v2 pp454, 467; WO95/1683 (8 Division CRA diary) BX/25 c20 9 15; WO95 3934 (Meerut Division CRA diary) 'Scheme C' 23 9 15; WO95 88 (No2 HARG) V Corps GX2568 14 9 15; WO95 1881 (14 Division CRA) 25 9 15. The details varied from place to place and there is no letter nor conference that can be traced as the inception of the barrage. Meerut and 8th Division had creeps as well as lifts, so even here it is impossible to trace a single point of origin.

¹⁷ Second Army MGRA letter EL1, 12 9 15, WO95/745.

The father of the idea is still a mystery. VI Corps had no famous thinkers. The MGRA at GHQ was an intelligent gunner, but no great tactical innovator; furthermore he was busy dealing with shells and guns.¹⁸ After the War various gunners remembered what they had done at Loos but no-one mentioned the other attacks, especially the June one, which rather devalues their testimony.¹⁹ There is a slight possibility that the idea came from the French, for naturally there was liaison between the Allies.²⁰ Unfortunately there is no record of any visit where barrages were mentioned, nor any mention in any British source of adopting a French idea. French artillery thinking of the time was broadly parallel to British ideas. In June a British translation of a French pamphlet spoke of the artillery 'increasing its range *progressively* in order to create ... a ...wall of fire under cover of which the infantry can advance'.²¹ In the absence of a study of all French units, it is possible the French thought of the lifting barrage first, but it appears unlikely.

A British pamphlet of late July built on June's results, using the term 'barrage' as something done during the infantry advance rather than as a barrier.²² The BEF was as worried about the shell shortage as about the Germans, and the General Staff enjoined against wasting shells on open ground.²³ This was another reason to prefer a lifting barrage to one that crept over every bit of ground, but this argument was not advanced in 1915. There is no evidence of the idea being acquired from the Germans; they first used something similar in March 1916 but on the Eastern Front; some sort of covering fire was also used at Verdun in late May.²⁴ However, both of these are several months after the BEF had used a prototype of a creeping barrage and no evidence has been uncovered that either side treated the idea as a secret weapon. In all likelihood it was a sensible idea that developed independently to help solve tactical difficulties.

¹⁸ JP DuCane; he was next sent to the Ministry of Munitions before returning to Corps command in 1916 to 1918, something he did with competence but little flair.

¹⁹ eg RS Hardman who credits Horne with the creeper and EW Alexander with the details (CAB45/116, 30 3 30) while Alexander (CAB45/137) credits Budworth. Headlam credited the French, entirely omitting his own earlier ideas about attacking in the open. Headlam to Rawlins, 26/1 19, Rawlins Papers.

²⁰ Becke, 'Creeping Barrage', p24 suggests the French were not using a *barrage mobile* at the opening of the battle of the Somme, but the French XX Corps in August 1915 were ordering their artillery to 'lengthen its range, little by little ... so as to form a barrage in front of the assaulting troops'. It does not appear to have been uniform practice in the French army. Third Army War Diary, 25/8/15, WO95 359.

²¹ CDS24, 'Object and Conditions of Combined Offensive Action' 6/15; emphasis in original. Whatever GQG said, there is no good evidence the French were using a creeping barrage. See below for comments on French barrages on the Somme.

²² CDS50, 'Tactical Notes' 31/7 15.

²³ see also OH1915v2, p173n4.

²⁴ Becke, 'Creeping Barrage', p24.

There were drawbacks with lifting barrages, indeed any barrage controlled by time-table. Since it was not controlled by observation, if a single German strongpoint resisted the effects would ripple through the British attack as the attacking infantry lost the protection and support of the barrage.²⁵ Their progress would be slowed, perhaps stopped altogether, and this would act as a drag to the units on either flank. However given the primitive communications of the day this was unavoidable and eventually flexible infantry tactics were the solution. Some allowance was made in case some portion of an attack was held up.²⁶ The infantry had to request from Corps a re-bombardment of the area in question; Corps would then skew the artillery from other tasks to dealing with the problem. The difficulties can be imagined: the infantry battalion had to pass a report to their Brigade, through Division to Corps, who then had to organise the requisite artillery batteries and pass orders; the artillery then had to hit the target. It was complicated and prone to break down at any stage in the process and the only short-cut that could be made was to specify that all such re-bombardments would last for 30 minutes, the last five being intense. This last was a double-edged sword, for if it served to warn the British infantry when the bombardment was due to end, it warned the Germans as well.

The battle of Loos was intended to lead to a breakthrough and the BEF had not neglected planning for the exploitation. Field artillery was to revert to divisional command once the breakthrough was completed, optimistically timed for 80 minutes after the first attack.²⁷ From then on artillery would presumably be operating as it had in 1914. Heavier artillery would remain under Corps control, and presumably would trundle forward as fast as it could. There was certainly no idea of using barrages on a daily basis to support steady attacks.

Based on the experience of 25th September, for the forthcoming battle - eventually the Somme offensive - the BEF adopted the concept of a barrage to support and protect the infantry attack. For an organisation supposedly so hide-bound and slow to react as the BEF this is impressive. Intelligent deductions and modifications were also instantly made. First Army spotted the essence of the barrage: 'The great object to be obtained [during the assault] is to prevent the enemy from manning his trenches ... A sudden "lift" of all artillery fire is objectionable, as it

²⁵ In 6th Division's smaller attack even the slightest check would have stopped the whole attack.

²⁶ OH1915v2, p467.

²⁷ OH1915v2 pp454-5, 467. Afterwards the lesson was deduced that centralised control was necessary for the set-piece battle, but affiliation must return when the 'fighting becomes indiscriminate'. Given contemporary communications problems, this was not unreasonable. Maxse Papers, IWM, f15, conference notes, 13 10/15.

informs the enemy when the assault is to take place ... and batteries should "lift" a short distance at a time'.²⁸ Reinforcing the wide acceptance of the previous year, again the subsidiary attack (at Gommecourt) used the same sort of barrage as the main attack, despite being in a separate Army. There is no evidence of any discussions about an army-wide barrage during the planning of the battle of the Somme, certainly not to the extent of the argument about the bombardment.²⁹ Rawlinson told his Corps commanders 'the guns must "arrose" each objective just before the infantry assault it' which by emphasising objectives suggests a lifting barrage rather than a creeping one.³⁰ Most Corps used a lifting barrage, expecting the Germans to be fighting from their trenches. British objectives were also defined in terms of German trench lines, and planning would have been simplified by also using these lines for the artillery. The first barrage maps were issued, whereas previously barrages had never been shown graphically; this was catching up with the procedure used for bombardments.³¹ Several Corps barrages had a creeping element that would deal with unexpected resistance or undetected positions.³² Instead of lifting straight from one German trench to another, these 'raked' or 'drifted' across the intervening ground. While Fourth Army clearly had told each Corps to provide some sort of barrage, the Corps varied, even within themselves. Different divisions had different artillery orders, different beyond the extent of men searching for clear words to express a relatively new idea. For instance in XV Corps, 7th Division ordered the artillery to lift at a rate of 50yds per minute while 21st Division contented themselves by merely having the barrage 'gradually drift forwards'.³³ This laissez-faire attitude is in sharp contrast with the general trend in the BEF. Divisions were becoming cogs in the machine, and Corps

²⁸ 'Some Artillery Lessons to be learnt from the Recent Operations in September - October 1915' Advanced First Army, 7/11/15, Rawlinson Papers, NAM. First Army also warned against a real creeping barrage because of the heavy ammunition expenditure, more of a concern in 1915 than 1916. Apparently some of these details were forgotten in the shake-up of BEF command six weeks later. The suggestions were repeated by field-grade officers at a 'college' but issued with the express disclaimer 'These notes are not official' rather than as an SS pamphlet. WO33/756, 'Notes on Artillery,' 6/16.

²⁹ On barrages on 1/7 16, see Becke, 'Creeping Barrage', for an excellent exposition. Becke's work, within his self-defined limits, is definitive.

³⁰ Fourth Army operations papers v4, conference 16/4/16. Barrage timing was based on the infantry's pace, lifts to take place just before the infantry were to arrive. Fourth Army GX3 1P, 5 6/16, *Ibid.* v7.

³¹ The first standardised system for marking bombardment maps seems to have been laid down in November 1916 (SS133). There must have been some rough-and-ready system previously, else co-operation would have been even worse than it was.

³² One source enthusiastically claimed III Corps had developed the creeper 'to a fine art' before 1 July. Regardless, III Corps fared badly. HWL Waller 18/4/30, CAB45 138. VIII Corps also crept back, at precisely the pace expected of the infantry advance, which proved too sanguine and sanguinary. WO158/410

³³ Becke, 'Creeping Barrage', pp29-30.

were gaining authority over their divisions. This trend was especially true for the artillery³⁴ so it is remarkable that so much latitude was left to individual divisions.

Many elements of the barrage on 1 July were the same as at Loos. Re-bombardments followed exactly the same pattern, half an hour with the last five minutes intense. A breakthrough was expected, and this time the cavalry were to be on hand to exploit. They kept their own RHA batteries, and a few 4.5" howitzer batteries were also allocated. These guns did some firing during the bombardment, but they were specifically ordered not to fire on 1 July to be the readier to advance.³⁵ During the bombardment before Z Day, there were even tricks to mislead the Germans about the infantry assault. Every day an 80 minute intense field artillery bombardment was fired, and the lifting/creeping barrages were practised. On Z Day the intense bombardment was to be 65 minutes, in hopes the German infantry would stay in their dugouts an extra 15 minutes, ample time for the attacking troops. As we know, this stratagem failed, and it was very nearly the last time an intense bombardment - signalling to both sides an impending attack - was used.³⁶

The development of the creeping barrage proper was one of the main tactical features of the battle of the Somme. It was not a smooth development but there were few blind alleys and those only on the smallest details. By the end of the fighting the BEF had a new shot in their locker.

In the first few days after 1 July there were few creeping barrages. This is unlikely to have been intentional and there are several reasons it might have happened. First, as Prior and Wilson have shewn, there were very few large attacks in the fortnight following 1 July.³⁷ Small attacks, organised by a divisional HQ, were less likely to have creeping or lifting barrages. These were relatively complicated and a divisional RAHQ would be stretched planning the bombardment, co-ordinating with the infantry, and using the divisional field artillery for some protective barrages. Corps became the echelon for organising creeping barrages, largely because divisions were overstretched. Second, the attacks were generally

³⁴ eg Budworth's 'Remarks based on Recent IVth Corps Artillery Operations', 6/10/15 which flatly declared 'The Artillery plan ... should be a Corps Artillery plan'. This was picked up by Archie Montgomery in his 'Lecture on Battle of Loos' (nd but early 12/15) but less so by Rawlinson in 'Artillery Lessons of Loos' (9/10/15). all Montgomery-Massingberd Papers, LHC, ff42, 45.

³⁵ GHQ to Reserve Army, 4/6 16, WO158/245.

³⁶ As best as can be determined, the first formal denunciation of intense fire was Fourth Army 32/3 98(G), 16 8/16, which forbade intensification or slackening of fire at Zero. see also OH1916v2, p567.

³⁷ Robin Prior and Trevor Wilson, Command on the Western Front: The Military Career of Sir Henry Rawlinson 1914-18 (Oxford: Blackwell, 1992), chapter 20, pp203-26.

hastily organised. It took eighteen to twenty-four hours to organise a creeping barrage in 1918 when all those involved had plenty of experience; organising one in mid-1916 could easily take two days. Third, the number of guns a division would have at its disposal would not have been enough for a useful creeping barrage. At this point a division would seldom have command of more than its own field artillery, 50-70 guns.³⁸ Deducting those necessary for defence, creeping barrages would be too thin to be much use. This was another reason for Corps to organise creeping barrages, because they could order other divisions' artillery to cover an attack.³⁹

Despite these difficulties, there were several attacks with a creeping barrage.⁴⁰ The large attack of 14 July went in with only a sketchy barrage. Oddly, XIII Corps who had a good barrage on 1 July made no plans for one whilst XV Corps had improved the quality of their barrage.⁴¹

A fortnight was enough for GHQ. On 16 July a memo spread the new gospel:

One of the outstanding artillery lessons of the recent fighting has been the great assistance afforded by a well-directed field-artillery barrage maintained close in front of the advancing infantry. It is beyond dispute that on several occasions where the field artillery has made a considerable 'lift,' that is to say has outstripped the infantry advance, the enemy has been able to man his parapets with rifles and machine guns. It is therefore of first importance that in all cases ... the field artillery barrage ... should not uncover the first objective until the infantry are close up to it (even within 50 or 60 yards).⁴²

This was repeated in SS119 '... Tactical Lessons of the Recent Operations'⁴³ and was ceaselessly reiterated until the end of the war.⁴⁴ Once tanks had appeared on the scene they drew considerable enthusiasm, but GHQ reminded Armies tanks are 'entirely accessory to the ordinary methods of attack, i.e., to the advance of infantry in close cooperation with

³⁸ Divisional artillery establishment varied between New Army, Regular and TF divisions. See Sir Martin Farndale, *Western Front 1914-18* (Woolwich: The Royal Artillery Institution, 1986), pp348-9.

³⁹ As the Somme fighting went on, divisional artillery gradually was divorced from the infantry, spending longer periods on the Somme than the infantry. Divisional artillery was stronger than necessary for defence, yet too weak to cover an attacking division. During the winter 1916-17 Army Field Artillery brigades were formed to provide a reserve of field artillery for the offensive.

⁴⁰ Becke, 'Creeping Barrage', pp35-6.

⁴¹ *Ibid.*, p37.

⁴² OA256, 16/7 16, quoted in Becke, 'Creeping Barrage', p38.

⁴³ 7 1916.

⁴⁴ The repetition does suggest the point was not always taken.

artillery.⁴⁵ Tanks themselves required the aid of a barrage, reminding the BEF which was the more important element.⁴⁶ Haig himself was interested in the new tactic, repeatedly jotting in his diary the minute details of successful creeping barrages.⁴⁷

While GHQ was proselytising, the troops on the Somme were already improving the creeping barrage.⁴⁸ By late September the terminology had finally been settled and a rule-of-thumb existed about the number of guns required. One 18pdr was needed for every 25 yards of attack frontage; 4.5" howitzers were automatically in proportion because divisions had three 18prs for every 4.5" howitzer.⁴⁹ Various methods were tried to obtain the best results; it would be too much to call these experiments. Some of the 18prs would search ahead of the main barrage, or fire a mixture of a lifting barrage and a creeping one, some lifting and the rest creeping.⁵⁰ The barrage might open in front of the first German trench if it was thought likely that the Germans had crept forward to avoid the barrage.⁵¹ Once there was an attempt at surprise, the creeping barrage starting three minutes after the infantry. The attack must have failed, because no repetition has been discovered.⁵² During pauses in the infantry's advance, the barrage might sweep back and forth to disconcert the German infantry and disrupt counter-attacks. The pace of the barrage was always a cause of concern: if too fast, the infantry would be left exposed to the German trench garrisons, if too slow then German reserves moved up and counter-attacks were organised.⁵³ From the artillery's point of view, the question boiled down to how many increments; the pace of the barrage was set by the GOC of whatever unit was involved, who listened more to the infantry than the artillery. For some time there were

⁴⁵ OAD169, 5/10/16, in Haig Diary.

⁴⁶ Fourth Army Papers, v5 '... Tactical Employment of Tanks (Provisional)', 8/16. See XIV Corps BGRA (WO95/915) 12-15/9 16 for how the two arms first co-ordinated.

⁴⁷ Diary, 4, 5 & 20 8/16.

⁴⁸ An example would be following the details through the Maxse Papers, IWM, ff17-27.

⁴⁹ This was roughly the contemporary French density, of a 75mm per 25 metres. Haig jotted down the ratio of 20yds per gun on 20/8/16. Maxse Papers, IWM, file 23. In 1917 it tightened to an 18pr per 15 yards, where it stayed for the rest of the war. When less vigorous German resistance was anticipated, a lower density was acceptable. Fourth Army foresaw 17yds/gun for a continuation of the Somme offensive, as opposed to 10yds gun for some of the small attacks. letter 305 2(G), 30 12/16, Fourth Army to GHQ.

⁵⁰ OH1916v2, p295n2. Developments took place at different times in different Corps. II Corps had their first multi-line creeper in late October, V Corps was very sophisticated shortly after joining Reserve Army. II Corps BGRA WO95 651 18/10 16; V Corps BGRA WO95/756, 10 16.

⁵¹ OH916v2, pp395, 479.

⁵² at least until 22/8/18 by which time circumstances had changed. OH1918v4, p197.

⁵³ When German resistance faltered, even momentarily, Haig stepped in and urged speeding up the creeping barrage. Diary, 8/10 16. Conversely at one point such a thruster as Hubert Gough wanted the creeper slowed so there was no chance of it getting away from the infantry. GA43 0 4, 16/9 16, WO158/344.

arguments about 50yd versus 100yd lifts but the artillery strongly preferred 100yds as it halved the number of adjustments for gunlayers and fuze-setters. Eventually this became standard.

While the field guns were firing the creeping barrage, the field and heavy howitzers would also be supporting the attack. The 4.5" howitzers would typically fire a lifting barrage a trench ahead of the creeper; they would also fire along communications trenches. Heavier howitzers would fire still further ahead aiming at strong points, HQs and other key targets. There was seldom any difficulty organising this sort of support and the infantry rarely complained about it. They did complain loudly if the 18prs were shooting short and the absence of complaints about larger guns suggests they were firing far enough ahead of the infantry.

One of the great problems of the creeping barrage was that it had to go by timetable. As explained above, this meant a local delay could ripple through an entire attack. There was little question of operating with observation rather than a timetable, so other adaptations were made. At first artillery liaison officers might have authority to alter the barrage.⁵⁴ While well-intentioned this negated the larger plans. In order to give the infantry the control over their own support they craved, another path was taken. Division commanders were given authority to switch some 18prs to help a checked battalion. However, as the guns were already firing somewhere else it meant robbing Peter to pay Paul.⁵⁵ With the BEF still short of artillery in 1916 there was little that could be done about this and the measure survived.⁵⁶ Indeed, it was broadened so that an infantry brigade commander could call upon a battery of 18prs while a Division commander could order a battery of 6" howitzers upon some unexpected centre of resistance.⁵⁷

As the battle of the Somme went on, efforts to use artillery 'on call' increased. Ground-based communications ranged from difficult to impossible, so the RFC lent a hand. 'Contact Patrols' were sent out to find what the infantry had managed to capture and where they were held up. Distinguishing friendly from enemy when both were muddy and lurking in shell-holes was a difficult business and not surprisingly many times infantry were cruelly

⁵⁴ eg 8th Division's 'Instructions for Artillery ... in Liaison with Infantry', 25 6/16, WO95 1684.

⁵⁵ Reserve Army spotted the problem and devised what would later be called 'superimposition', whereby some guns thickened the barrage but were available to be switched to where they were most needed. GA15 0 1, 14/7 16, WO158/344. This idea was either Gough's own, or that of Walter Strong who was temporarily MGRA at Reserve Army; neither man is usually hailed as an innovator.

⁵⁶ Occasionally a reserve of guns was held, as in XIII Corps. OH1916v1, p158.

⁵⁷ 18th Division Operations Order 66, 27 10 16, Maxse Papers, IWM, f64; WO158/419. A battery of 6" howitzers was standard, at least in XIV Corps, by the end of 9 16. Sometimes the CRA controlled the 4.5" howitzers as well, only 18prs firing the barrage; ibid., XIV Corps Artillery Operations Order 18, 11 9 16.

shelled by their own guns, or indeed from both sides. Since the infantry lacking other recognition methods had to lay out cloth panels, as easily visible to foe as friend, it was a case of being between a rock and a hard place. During the Somme fighting aerial co-operation improved considerably. Previously it worked best in quiet trench warfare, mainly correcting bombardments of fixed targets. On the Somme the RFC developed the system of 'zone calls' which allowed much faster reaction, fast enough to deal with moving targets or tactical situations such as a counter-attack.⁵⁸

Over the winter of 1916-17 the BEF absorbed the lessons of the Somme campaign. Most infantry divisions had fought under a creeping barrage and about half the Corps had organised one. The new batch of SS pamphlets had much to say about barrages, from purpose to execution. According to 'Artillery in Offensive Operations'⁵⁹ 'the support of the infantry during the attack is at least as important' as the bombardment. The main purpose of field artillery was now barrages; it was realised 18prs had little part to play in bombardments.⁶⁰ Artillery was, as always, an aid to the infantry: 'The barrage has two main properties: (a) it is a man-killing agent; (b) it acts as a screen to cover the movements of the infantry from view'. Finally there was a cautionary note:

The barrage system has been lately developed. It must be remembered that, while the following notes deal with the procedure that has recently been the most successful, it is only to be expected that the enemy will devise new methods to defeat our barrage fire. New methods on his part will call for immediate modifications in our artillery tactics.

Not just tactics were reviewed; technical details were also spelled out, with advice on all natures of barrages and ammunition.⁶¹ Meanwhile the gunners reflected on how best they could support attacks. Charles Budworth, MGRA of Fourth Army, drew on his months of experience at the centre of the battle for some lessons:

During the Battle of the Somme, generally speaking the "Infantry has been required to conform its movements to those of the Artillery barrage." This is right practically, nevertheless, theoretically the "Artillery barrage should conform to the movements of the Infantry".⁶²

⁵⁸ SS120 (9 16) '... Co-operation between Aeroplanes and Artillery During an Advance' and SS124 (8/16) 'Notes for Artillery Officers on Shoots with Aeroplane Observation'.

⁵⁹ SS139 4, 2/17 and reprints.

⁶⁰ They did have a role in harassing fire, especially at night. In 1917 the use of single guns in the front line, to destroy a spot target, was largely discontinued.

⁶¹ GHQ Artillery Circular No5, 'Technical Notes on 18pr Barrages', 26/3 17 (Headlam Papers). Presumably this codifying of ideas already incorporated in the Arras barrages rather than last minute alterations.

⁶² 'Artillery Notes and Statistics, Battle of the Somme, June to November 1916', 11 16, Rawlinson Papers, NAM; punctuation as in original.

Budworth clearly kept to the pre-war conventions on which arm was decisive and which was supporting.

Already during the Somme fighting the Germans had altered their defensive tactics and barrages had been adapted. In 1917 many more changes were en route. As the Germans relied more upon defence-in-depth and less on a strong front line, the importance of bombardment declined and that of the barrage rose. Two pieces of new technology improved barrages. There was also a small return to direct support, but only in exceptional circumstances.

The Germans wrong-footed the BEF by withdrawing to the Hindenburg Line, leaving only rear-guards to delay the Allied advance. With their customary tactical skill the Germans extracted the maximum of delay with the minimum of troops, holding woods and villages until the situation got too hot. This was typically when the Allies brought forward a few guns.⁶³ It was seldom necessary to develop a full bombardment and barrage and Fourth Army reported to the rest of the BEF how appropriate FSR and FAT were for mobile warfare.⁶⁴ Besides the usefulness of having a few 18prs forward to deal with isolated strongpoints, the second lesson was the effect of a few heavy pieces. These were effective out of proportion to their numbers from the sheer morale effect of a large shell upon an isolated rear-guard, which generally chose discretion over valour.

Back in trench warfare, the Germans sprang a new trick upon the British. They fired machine guns from long range, beyond the British barrage and quite safe from it. There were three obvious answers, and all were quickly deduced, passed up and down the chain of command, and acted upon. First, the 'back' or protective barrage (fired to protect the infantry at their objective) could sweep further back than hitherto.⁶⁵ This would shoo the German MGs out of range. Second, the whole creeping barrage could be in more depth than before, instead of three lines of shells (two from 18prs and one from 4.5" howitzers), a whole range of guns could be added.⁶⁶ The obvious sense of this meant the idea was rapidly adopted by all

⁶³ see WO95/432, 30/3/17 for details.

⁶⁴ SS156 (4/17), 'Notes on Recent Operations, Compiled by GS Fourth Army'.

⁶⁵ In early 1917 the protective barrage might be only 3-400yds beyond the objective. Third Army Artillery Instruction 13, 19 4/17, WO158/312; WO106 399, Canadian Corps Artillery Instructions for Vimy.

⁶⁶ Second Army noticed this in 1 17, predicting the German tactic before it was sprung on the British and long before Second Army could have experienced it. WO158/18, 30 1 17. 18th Division had suggested it on 12/9 16. 18th Division AB [none], Canadian Corps BGRA diary WO95/1059.

echelons of command, including Haig himself.⁶⁷ Thus 60prs were mixed in, more heavy howitzers and, for the first time, machine guns firing over the heads of advancing infantry. By October 1917 there might be as many as seven belts of fire in a creeping barrage, covering 1000yds of the battlefield at any moment.⁶⁸ Each of these belts could independently move forwards or backwards so German infantry would never know when it was safe to come up and man their positions. The third technique for defeating deep MGs was to obscure their view. Ordinary shrapnel shells produced a bit of smoke, but in 1917 smoke shell was introduced for the first time.⁶⁹ Techniques for using smoke shell were disseminated long before there was enough smoke shell for wide-spread use - April 1917 - but not accepted with particular grace. 9th (Scottish) Division first used smoke in a creeping barrage despite it having been forbidden.⁷⁰ After their spectacular success on 9 April- the best single penetration of German trenches between 1914 and Cambrai - enquiries were made about their methods and the truth came to light.⁷¹ In a week the limited supply of smoke shell was being earmarked for special operations.⁷² An organisational change also led to improvements in the creeping barrage. In 1916 the CRA of the attacking division was put in charge of all the field artillery supporting the division. While this meant unity of command, it was exercised direct to the brigades, which meant a single CRA trying to control perhaps 10-12 brigades of artillery. In 1917 artillery brigades were slightly larger, so the same number of guns required fewer command echelons, and grouping was used. Brigades would operate in pairs or even threes, reducing the amount of work for the one divisional staff.⁷³ Another option that presented itself thanks to the improved staff work and infantry fighting skill was varying the barrages. It was

⁶⁷ Diary, 12/5/17. Haig pressed his army commanders to deepen and think through their barrages at a conference on 30/4/17: OAD426, Fourth Army operations papers v21. Third Army had hints of a deeper 'creeper' two days before this, and on the 30th were ordering smoke barrages to blind MGs and a protective barrage 500-1000yds beyond the furthest objectives. Third Army Artillery Instructions 16, 17; WO158/312.

⁶⁸ For full details, Second Army G140, 'General Principles on which the Artillery plan will be drawn', 29 8/17, WO158/208.

⁶⁹ There had been smoke bombs for 4" Newton mortars since the battle of Loos, but the range of these was too limited for much effect in large battles. Fourth Army suggested artillery smoke in October 1916, before it was available; presumably this was another support for introduction. WO95/431, 13/10/16.

⁷⁰ The excuse or reason was the 'alignment of enemy trenches'. Sir Hugh Tudor Diary, RAI military document 1167. (hereafter Tudor Diary) The OH gracefully glides over the situation. OH1917v1, p227n2.

⁷¹ *Ibid.* Tudor claimed XVII Corps suppressed the report when they saw it would get them in trouble, but XVII Corps diary puts a different 'spin' on the question: WO95/942, 16-19 4/17.

⁷² OAD402 (Army Commanders' Conference 16/4/17); smoke was to be used to blind a valley between two attacks. Fourth Army operations papers v21.

⁷³ Sometimes there was further division of the artillery, with a division forming two artillery groups, one supporting each infantry brigade. CAB45/118, CAL Brownlow to Edmonds, 'Notes on Cambrai', nd; CAB45 116, CG Stewart to Edmonds, nd.

possible to organise a creeper to a certain distance, then shift to firing concentrations on specific targets whilst the infantry fought around the artillery fire.⁷⁴

As mentioned above, in 1917 the relative importance of bombardments and barrages changed. In 1916 despite a famous bombardment, there were not really enough guns to effectively deal with large sectors of the German line. In 1917 there were: new batteries were still pouring forth from England and new equipment was arriving to improve the efficiency of troops already in the field.⁷⁵ More and better guns fired more and better shells; the Germans predicted what was coming and gave up linear defences. More emphasis was placed on counter-attacks, delivered immediately the British infantry halted or even while they advanced.⁷⁶ Strongpoints were more bases for manoeuvre and rallying-points than places to be held to the last man. Thus there were fewer good targets for the British bombardment, yet more targets overall. In the opening stages of battles in 1917 it could frequently be remarked that the bombardment was too good, destroying trenches the British infantry would be glad to defend once they had captured them. Meanwhile the German infantry were moving and fighting above ground, excellent targets for the barrage. This became more pronounced as the year went on. At Arras the creeper was only marginally better than in 1916⁷⁷, because the Germans in that sector were slow to adopt the new defensive tactics and so there was less urgency in improving the barrage.⁷⁸ However for Messines the bombardment was important because of the limited objective. Once their defences were smashed and the ridge captured by the British, the Germans saw sense and did not waste troops counter-attacking in circumstances where artillery would have eaten up their infantry. Similarly, in the fighting for Hill 70, the Canadians used massive artillery support to destroy German counter-attacks launched to regain key ground. This was intelligent application of fire and movement, but in a way not foreseen in FSR.

It was during the Passchendaele campaign that the creeping barrage reached a pinnacle of

⁷⁴ 15th Division did this after their first objective at Arras; 37th Division (nominally an exploiting division) did so after the third objective. Field-Marshal Sir John Dill Papers, LHC, ff1 3 1-2.

⁷⁵ See IV Hogg and LF Thurston, British Artillery Weapons & Ammunition 1914-1918 (London: Ian Allen, 1972) for details of improvements in British artillery equipment.

⁷⁶ On German defensive tactics see GC Wynne, If Germany Attacks: The Battle in Depth in the West (London: Faber & Faber, 1940). Deeper barrages also forced counter-attacks to assemble further back and the assembly areas would also be shelled. Birch to Hunter-Weston, 4/5/17, Anstey Papers.

⁷⁷ Though some had extremely advanced barrages, like 15th and 37th Divisions; see note 65 supra.

⁷⁸ Steps did have to be taken against counter-attacks, for instance detailing aeroplanes with a direct call to some batteries to watch for assembling German troops. GHQ OA715, 1 5 17, WO95 363.

development.⁷⁹ Several times during the campaign the BEF spent weeks bombarding the German defences; in between there were battles fought where the main artillery contributions were CB fire and barrages. Indeed, so heavy were the creeping barrages that some thought they could replace the bombardment, at least occasionally.⁸⁰ The initial hopes were for a breakthrough, so the barrage was organised to provide cover in depth.⁸¹ This failed because the objectives were beyond range of the field artillery, and heavy artillery was technically unsuitable for a creeping barrage.⁸² Once Second Army took over the effort they realised barrages had to be organised as never before.⁸³ Indeed, the creeping barrage became a weapon in its own right, not just support for the infantry. Sweeping back and forth, varying the timing from day to day the barrage killed as many Germans before an attack as it suppressed during one. Practice barrages - normal since June 1916 - were so organised to lure the Germans to assemble counter-attacks in certain areas.⁸⁴ These areas would then be shelled during the actual attack. Second Army also developed the 'prisoner barrage' which was exceptionally dense and fired on three sides of a rectangle. It was then pulled towards the British lines, leaving German infantrymen the choice of surrendering or accepting appalling risks from shellfire.⁸⁵ With the German fixed defences shattered by the weeks of bombardment, barrages sweeping back and forth across the landscape broke down the last element of German resistance: defensive organisation. By the end of the second phase of the battle the Germans had to abandon defence-in-depth, returning to defending one line by sheer weight of numbers.⁸⁶ This made even more men vulnerable to British shellfire and in the end it was only

⁷⁹ Fifth Army's barrages in September- October can be traced in WO158/250; V Corps' in WO95/756.

⁸⁰ Tudor thought battle of the Menin Road Ridge could be fought after barrages, with bombardment superfluous. Diary, 9/17.

⁸¹ Heavy artillery was also going to be parcelled out to divisions once the breakthrough was underway, at zero+ 490mins. Maxse Papers, IWM, f33.

⁸² The infantry had to stay too far from the bursting shells; using heavy artillery for a barrage also took it away from CB work. However, see OH1917v2, p71.

⁸³ Simple steps like barrage planning diagrams appeared. Fifth Army were less advanced, once returning to the idea Division commanders could control their own creeper regardless of neighbours. XIV Corps BGRA WO95/916, 12/8/17.

⁸⁴ Practice barrages were also good for the morale of British infantry. Fifth Army GA43/0/4, 16/9 16. Fraser-Tytler put it more vividly, that the infantry 'were fairly out for blood, and after seeing the practice barrages ... there was some confidence flying about'. Neil Fraser-Tytler, Field Guns in France: With a howitzer battery in the battles of the Somme, Arras, Messines & Passchendaele 1915-1918 (Brighton: Tom Donovan, 1995), letter c4 6/17.

⁸⁵ V Corps, WO95/756, 16/9 17 and for Second Army methods in general.

⁸⁶ Fifth Army was modifying its artillery tactics as fast as, or faster than, the Germans. See Unacke's 'Attack Barrages, as modified by the enemy's latest tactics', (RA225, 25/8/17, Maxse Papers, IWM, f35 2) and Rawlins, History, pp141-5, 152-6.

bad weather that stopped the BEF. This is not to underplay the bad weather: appalling for the infantry, it was only marginally better for the gunners. Guns sank into the morass, living conditions were dire and the Germans did everything they could to make life more dangerous. A German shell fired at random into the Ypres Salient was likely to hit something, and mustard gas made harassing fire that much more terrible. The gunners stuck it out, obeying the principle that as long as the infantry were exposed to German fire so long would the gunners stand to their pieces no matter how heavy the German CB fire. Haig watched the success of British tactics with delight, but unfortunately turned a blind eye to the toll exacted from the BEF.⁸⁷ His eyes were fixed on the number of German divisions rotated through Flanders, but he seems never to have noticed the same thing was happening to the infantry of the BEF.

All through 1917 the details of creeping barrages became second nature to the field artillery. The RFA had been relieved of most other duties - only a bit of wire-cutting and some harassing fire besides barrages - and constant practice improved skills and performance. Another indication that the infantry battle was again paramount was the declining importance of CB fire. After the prolonged preparations for a battle German artillery was usually mastered. Even when it was not, the creeping barrage was considered more important than CB, and guns were switched into thickening the barrage. The circumstances of each British attack differed, and the artillerymen did their best to adjust the barrages to changing circumstances, the duration of the preliminary bombardment, depth of objectives, density of guns and troops and a host of other considerations. It was truly a matter of orchestration by men who have earned their subsequent appellation of 'master gunners'.

The mammoth protection and support the creeping barrage gave to an infantry attack led to over-reliance.⁸⁸ While the infantry were improving their fighting skills from the nadir of 1916 - when the BEF came close to the idea of artillery conquering and infantry occupying⁸⁹ - there was a hesitation to stand on their own two feet. Enormous bombardment was no longer necessary to break into an ordinary trench line. Instead the infantry could fight their way forward, using new weapons but more importantly better minor tactics.⁹⁰ British infantry

⁸⁷ In his diary, he blandly noted 'our tactical methods have defeated those of the enemy'; 7 10/17.

⁸⁸ Ludendorff tartly wrote of 1917 'We must differ essentially ... from the attacks hitherto undertaken by the British. They believed in the efficacy of their skillfully worked out but rigid artillery barrage. This was to carry forward the infantry attack which advanced without any impetus of its own. The subordinate and, still more, the higher commanders, ceased to have any further influence'. Historical Sub-Section, General Staff, American Expeditionary Force, *A Survey of German Tactics, 1918* (Washington, DC: Government Printing Office, 1918).

⁸⁹ eg II Corps G1266 'If the artillery plan is complete and the gunners are given full time to carry through their programme, the battle is three quarters won before our infantry appear on the scene at all'. 19 9 16, WO158/344.

⁹⁰ eg Byng's GS50 (10/8/17; WO158/311), and the constant calls for improved marksmanship.

were of course learning about the attack under trench warfare conditions rather than about open-warfare infantry tactics.⁹¹ Thus they were far better at fighting through trench lines protected from counter-attacks by a barrage than at themselves out-fighting the counter-attacks. With the constant toll of casualties and stream of replacements it was naturally difficult for the infantry to progress beyond a certain level of competence. Instructors must also have been in short supply.

Given the proven efficacy of creeping barrages, it is no surprise infantry commanders insisted on plenty of artillery support. Even some with good reputations had lapses, such as Ivor Maxse writing 'I hold the view that ground is gained by artillery, that ground is defended by artillery, that battles are won by artillery and that battles are lost by artillery'.⁹² It was left to senior artillery commanders to remind the infantry there was something beyond trench warfare. Frustration mounted with infantrymen who 'thought a creeper and a heavy howitzer barrage 200yds beyond would take them to Berlin'. Birch's reaction was scathing and sarcastic.⁹³ Other gunners faced with the same mind-set were more philosophical, reminding themselves that artillery was a supporting arm and everything it did was to facilitate the infantry closing with the enemy. Herbert Uniacke, fresh from directing Fifth Army's artillery through a long year of battles, wrote a 21 page report on artillery developments that year, leading his audience through technical and tactical developments of varying importance. He concluded by reminding his readers of the ultimate purpose of the artillery's war: helping the infantry to 'gain their objective with the minimum of loss - always bearing in mind that the final decisive factor is the bayonet of the Infantry soldier'.⁹⁴ Uniacke also pointed out the futility of infantry attacks across impossibly muddy ground, but couched his arguments oddly. Gunners fired barrages at the rate the infantry asked, and so Uniacke commented there was no point attacking if the barrage would be slower than 100yds in 6 minutes. There was no doubt he would fire such a barrage if asked - during Passchendaele he did - but it was not sensible.

Perhaps some of the infantry obsession with barrages was because they lost their 'own' batteries. These were replaced with guns under central control.⁹⁵ These extra guns - up to a third of the barrage - were 'superimposed', that is, firing the ordinary barrage until called onto

⁹¹ The Germans did the same, teaching trench warfare as a separate kind of fighting. Die Angriff im Stellungskrieg, translated as SS748 'The Attack in Position Warfare', 10 18.

⁹² XVIII Corps GS69 to Fifth Army, 12 8/18, Maxse Papers, IWM, f35 4.

⁹³ Anstey galley proofs p140. 'This is my aunt' if Anstey has not bowdlerised the comments.

⁹⁴ Uniacke papers, VII 2; original emphasis.

⁹⁵ Guns allotted to divisions survived as late as Messines, with each division having two 18pr batteries, and a battery each of 4.5" and 6" howitzers. One interesting transition feature of Messines was having a few heavy guns per division which would deepen the barrage where locally necessary. WO158/413

a special target. These might be centres of resistance, counter-attacks or guns that revealed themselves. The advantage of centralised control were two-fold. Information could come from any number of sources including aeroplanes, balloons, artillery observers or the infantry themselves. Previously it had been up to the infantry to request the support and, brutally, infantry that needed support most were least able to request it. Also, guns were not wasted sitting still while waiting for a target to be reported- they were already thickening the barrage.⁹⁶

The final battle of 1917 saw a considerably different barrage than previously. At Cambrai surprise was the key element- the surprised Germans had no time to man intermediate positions, so a creeping barrage was unnecessary.⁹⁷ Instead, Third Army organised a lifting barrage that shelled each German trench in turn. Despite seeming a step backwards, the barrage functioned smoothly and there were no complaints about the method. Anticipating a breakthrough, steps were taken for artillery support beyond the barrage.

A new method was devised, combining the pre-Somme plans for cavalry pursuit with the experience of the advance to the Hindenburg Line. Cavalry divisions would have their own RHA batteries and a few additional 4.5" howitzer batteries, but these guns would take part in the initial barrage.⁹⁸ The leading infantry divisions also received extra batteries, but of 6" howitzers and 60pr guns.⁹⁹ These had proved both mobility and utility during the advance to the Hindenburg Line, and indeed did so again along the Canal du Nord, large shells having considerable morale effects. The breakthrough at Cambrai was illusory and the battle dragged on, but with different artillery methods. Once the initial surprise wore off and the tanks broke down, creeping barrages were needed. After the guns advanced from pre-surveyed battery positions they could not fire a predicted barrage. Typical 1917 conditions returned after a single morning's blip.

1918 began with the BEF on the defensive, with little call for creeping barrages. During the desperate fighting to repel the German attacks, organised barrages were few and far between. British counter-attacks were generally small affairs and artillery support - if any - was generally provided by a few guns firing either over open sights or at specific targets. The few times relatively large counter-attacks were organised it took the artillery far longer than the infantry to

⁹⁶ SS131 details RFC co-operation. This also reflects better command links.

⁹⁷ Elles and the Tank Corps may have been cautious of risking their tanks too close behind a creeping barrage. CAB45 137, TA Tancred to Edmonds 3 4/c35. Tancred was BGRA of III Corps at Cambrai.

⁹⁸ The 4.5" batteries even received extra horses to improve their mobility. A horse shortage had developed by early 1917 and RHA were the only units to retain their pre-war horse strength and hence mobility.

⁹⁹ OH1917v3, p29.

organise. Creeping barrages were time-consuming for planning staffs¹⁰⁰ and also required many supporting elements that were rarely present in even semi-mobile warfare.¹⁰¹ They required vast quantities of ammunition which was difficult to organise to the right place at the right time when everything was moving, batteries, command posts, and ammunition resupply points alike. Communications were severely disrupted because the networks of buried cable had been left miles behind. Commanders had to organise what support they could through runners, gallopers and whatever telephone links survived or were hastily laid. One officer tersely summed up: 'the more [telephone] wire you give us the more Huns we shall kill'.¹⁰²

All this did not mean that counter-attacking infantry fought alone. If conditions were difficult for the British artillery the Germans suffered too. Most importantly they were not in strong defensive positions. Often there were no trenches for them to defend and they were correspondingly vulnerable. If counter-attacks had been vulnerable during Passchendaele, attacks were equally so in the Kaiserschlacht. The effectiveness of even a few guns firing on an unprotected target contributed heavily to the large number of successful, if small-scale, British counter-attacks.

Once an equilibrium had been re-established on the Western Front the BEF began making small attacks. These attacks varied, some to seize strong positions, others to exploit weak ones. Correspondingly, the bombardments varied, but barrages varied less. Typically these were very dense; it always proved possible to mass large amounts of artillery for these minor attacks. The German infantry involved were often poor quality, and did not fight hard. Generally the British barrages used any munition that was available - gas, smoke, HE, and shrapnel however might be most effective - these were extremely practical barrages rather than following any sort of BEF-wide formula.¹⁰³ In virtually all cases there was no exploitation of these minor attacks, so the RA did not engage in direct-fire support of the infantry.

When it came to a major attack, breaking through a main German line with the intention of pursuit, the situation was somewhat different. Organisation was little altered but barrages would be thinner. GHQ warned Armies that the heavy concentrations so typical of 1917 could

¹⁰⁰ to the extent there was even Army Form W3981 'Barrage Table for No. Gun' to be filled out for each gun; RAI military document 1348

¹⁰¹ One Corps could prepare a creeper in 19 hours by 8/18; during the battle of Villers-Bretonneux estimates were around 24 hours. F Fitzgibbon 16/10 38, CAB45 185; [OH1918v2](#) p397.

¹⁰² WO158/343.

¹⁰³ Compare the attacks at Meteren and Hamel; [OH1918v3](#) pp200-11.

not be repeated, that the infantry had to do more themselves.¹⁰⁴ When penetration instead of mere occupation of the German lines was intended, forward artillery support had to be provided. In 1917 this had proved quite difficult because the field artillery had to be a safe distance behind the British lines, as protection against German CB fire. In 1918 British attacks had either surprise or artillery superiority, or both. Therefore barrage guns could be further forward, providing deeper coverage. This was still not enough with penetration of German lines measured in miles instead of hundreds of yards.

Mobile artillery support was necessary, and took several forms. Some artillery brigades would be earmarked to move forward early in a battle; typically these would be the superimposed brigades so the barrage was not weakened. Brigades would then leapfrog forward and the creeping barrage would be continuous. Sometimes the first objective would be chosen as the furthest point to which a full barrage could be fired; thereafter mobile artillery was the only support.¹⁰⁵ There were times when this was not enough, especially for breakthrough forces like cavalry. RHA batteries would be attached under the command of forward regiments or brigades.¹⁰⁶ Some infantry formations adopted similar steps: a field battery would work with each infantry brigade, using observed but indirect fire rather than plunging straight into the front line.¹⁰⁷ Sometimes this was still insufficient, and a pair of guns would be attached to a battalion, fighting up in the thick of things.¹⁰⁸ For the times when close support was impossible, the guns simply ceased fire, creating safe areas where the infantry or cavalry would have to use their own skills to fight forward.¹⁰⁹

Whenever the Germans occupied solid defensive positions the BEF wisely paused and mounted a deliberate attack to break the position.¹¹⁰ This involved a full series of barrages.

¹⁰⁴ OAD291/33/1, 11 6/18; GP Dawnay Papers, IWM. Here Haig's words to his Army Commanders were prepared by the RA: the draft is in SWH Rawlins' handwriting. Rawlins Papers, 1160/1, 9/6/18.

¹⁰⁵ eg Fourth Army 220(G), 21/7/18. Fourth Army operations papers v49.

¹⁰⁶ Some cavalry officers complained the RHA were not advancing fast enough, and also that RHA and MGs required co-ordination by regimental commanders, cavalrymen preferring to be free of grubbier types of soldiers. Cavalry Corps 'Notes on Recent Operations No5', 24/8/18, Fourth Army operations papers v65.

¹⁰⁷ Some urged on by senior commanders, like Rawlinson. 'We are now engaged in open warfare when the fire of guns - both Field and Heavy - has to be directed largely from direct observation and on the initiative of subordinate Commanders'. Fourth Army GS20 14(G), 27 8/18, Fourth Army operations papers v49.

¹⁰⁸ Canadian Corps had an elegant scheme whereby each battalion worked with one battery. Four guns would operate as a unit with indirect fire while the remaining section provided direct fire support. 'Artillery Notes on Attack by Canadian Corps, August 8th 1918', WO95/1060.

¹⁰⁹ Fourth Army 20/36(G), WO158 242, 7 10 18; II Corps BGRA, 22 9 18, WO95 653.

¹¹⁰ At least one Division warned its advanced guard not to attack bald-headed but let the CRA organise proper support. The advanced guard had an 18pr battery, the 'vanguard battalion' only two guns whilst the CRA had four brigades of RFA and a brigade of RGA. Staff College Syndicate Report 1927/7, 'Battle of the Selle'. Fourth Army issued a similar warning to Corps in October. WO95 439, 23 10 18.

just as in 1917, to demoralise, weaken, and confuse the defenders. The difference was after the initial phase of such battles, after the main resistance had been broken. Now there was more chance of exploitation and less of major German counter-attacks, so artillery support was modified, with barrages fired until the infantry cracked the German line, then concentrations on key terrain features. Infantry would operate around these points, using their own tactical sense rather than having to follow an even-paced barrage.

More time was spent pursuing the Germans than turning them out of defensive lines, and trench-warfare tactics had to be adapted to suit the circumstances. Barrages were often very thin, as much guiding the infantry where to advance as protecting them. In this regard smoke shell or the few incendiary rounds were especially useful.¹¹¹ Frequently there was little time to prepare fancy barrage maps, and the barrage would be fired along some simple terrain feature, the infantry conforming to the barrage rather than the reverse. Thin barrages were no problem because the Germans were in weak positions, perhaps just resisting wherever they happened to have spent the night. Goaded by Haig, Armies urged greater speed in the advance, complaining the infantry relied too much upon a barrage and not enough upon their own weapons.¹¹² Some Armies standardised their barrages, so Corps and divisions could operate interchangeably and not waste time fine-tuning barrages when there was little to be gained from the extra effort.¹¹³ While infantry leapfrogged forward, field artillery was more continuously engaged, so there were usually at least two divisional artilleries backing each division in the line. This was no challenge for CRAs who had dealt with more field artillery in 1917 or 1918. However in the mobile fighting of 1918 some heavy artillery was attached to most divisions. Generally each division got a 'Mobile Brigade RGA' composed of two batteries of 6" howitzers and two batteries of 60pr guns.¹¹⁴ Corps might retain some authority over these guns, mostly for CB work, but the bulk of the time the CRA had control.¹¹⁵ Thus the division was itself firing not only a creeping barrage but organising the distant fire on specific targets that Corps had previously handled.

¹¹¹ III Corps Narrative, 18/9 18 - 11 11/18, Fourth Army operations papers v63. (henceforth III Corps Narrative) Incendiary shell had been tried several times and found wanting. There was little enough to set alight in most 'woods' on the Western Front.

¹¹² Haig Diary, Army Commanders' Conference 11 6 18.

¹¹³ for Fourth Army, see Montgomery-Massingberd Papers, ff79, 82 or III Corps BGRA WO95/694 20 8 & 12/9 18; Fifth Army Artillery Instruction No120, 7 11 18, WO158/254.

¹¹⁴ Third Army specifically warned against attaching too much heavy artillery. WO95/372, 30/8/18.

¹¹⁵ This worked much better when the Division had an RGA brigade HQ to handle the batteries. III Corps Narrative; Fourth Army GS 262(G), 2/9 18 'Control of Heavy Artillery in Moving Warfare'.

In addition to creeping barrages, close support was constantly needed. Training over the previous winter had improved the artillery's standard of mobility and the spring retreats gave practical experience. Training continued in early summer, specially emphasising mobile operations, so field artillery was generally quite capable. There were still plenty of officers who had no personal experience of what lecturers tried to drive into them, so aggressive use of field guns was a patchy affair.¹¹⁶ However patchy, it was the right thing to be doing, and there were exhortations to read the relevant sections of FAT. Uniacke as Deputy Inspector General of Training rushed out leaflets encouraging direct support, quoting experience rather than FAT's theories.¹¹⁷ Repeated printings of the leaflets suggests the lesson was not reaching everyone. On the other hand there were subalterns who blithely meandered across the battlefield with their guns doing as they saw fit, ignoring and enraging infantry battalion commanders. When heavy artillery was pushed forward it seldom engaged over open sights and was generally better behaved.¹¹⁸ In the very last days of the war there was no need for barrages and only spotty need for much fire support at all.¹¹⁹ British spearheads were stretching the lines of supply to the breaking point and artillery ammunition was low on the list of priorities. Many units were put into reserve, which generally meant two things: horses were taken away to help other units and men put to work mending roads.

Throughout 1918 most senior officers recognised that three things could make the infantry's job easier. Air support, tanks and artillery were supporting arms, sometimes referred to as auxiliaries. Aeroplanes depended on the weather, and tanks were mechanically unreliable.¹²⁰ Artillery was the most reliable and most powerful aid to the infantry, but it could not do everything. Intelligent commanders thought in terms of the supporting arms reducing losses to

¹¹⁶ eg Lecky's bitter RA/3259 of 17/6 18. This could be as much an infantry as a gunner problem. Guns were parcelled out to the infantry who had adapted themselves to trench warfare. Staff College Syndicate Report 1929/11, 'Operations, 4th Army, August 1918 (Special Reference Canadian Corps)'. At this point the artillery ration for a battalion was a section of guns and a few mobile trench mortars.

¹¹⁷ Haig joined the bandwagon as soon as he saw the leaflets; diary 23/8/18. It is not necessary for a commander-in-chief to be the fount of all wisdom, and Haig supported a good idea when it came to him.

¹¹⁸ CG Fuller to Edmonds, 10 12/39, CAB45/188. III Corps was pushing RGA up ahead of Fourth Army's suggestions in 8-9 18.

¹¹⁹ By October barrages were a rarity in Fourth Army, generally only going a few hundred yards and then giving way to close support batteries - including sections of 6" howitzers operating as far forward as 18pr batteries. XIII Corps Narrative 3 10/18 - 11 11 18, Fourth Army operations papers v64.

¹²⁰ The Tank Corps was constantly nagging the RA for protection, at one point asking the gunners to deal with 'all anti-tank devices'. (WO158/855 'Co-operation of Tanks with other Arms, nd but very late 1918; see also Fifth Army SG671 9 of 7/8/17, Maxse Papers, IWM, f35 4) Smoke proved useful, and various special methods were adopted such as assigning aeroplanes to watch for AT guns, with the authority to turn on 60pr batteries. Tanks were, and are, not in themselves decisive.

the infantry, a vital point in a diminishing BEF. Infantry brigades had lost one-quarter of their strength at the beginning of the year and were still not up to strength even with callow youths and half-fit older men. In the circumstances commanders leaned on artillery to do as much work for the infantry as possible. As Birch wrote, 'All Army Commanders are at me not to reduce the Artillery and say with the present state of the infantry they cannot do with a gun less ...'.¹²¹ This was quite true, but only in a relative way.

Taking for example the battle of Valenciennes just ten days before the Armistice, the Canadian Corps assembled perhaps the heaviest artillery support for any small attack in the war.¹²² After a punishing bombardment, the German lines were swept by barrages from all directions: frontal, enfilading and even reverse barrages. Fire was calculated so that, theoretically, no German infantryman could survive. Naturally some did and the infantry took roughly 35% casualties.¹²³ Losses were low in absolute terms - 501 Canadians - but not in percentages. This was not an unusual figure for infantry losses in any war, so the artillery were not necessarily reducing the rate of casualties. What the artillery did was reduce the number of infantry needed. Artillery fire could be used, say, to deny the enemy a hill at a crucial time rather than the infantry having to storm the hill. This sort of theory was, however, going far beyond what was being said in 1918. Most commanders simply used artillery as they had been taught to use it, if they had formal instruction, or adapted intelligently.

The use of barrages then came nearly full circle in the war. Simply shelling before an attack proved fatally inadequate, so the barrage was developed to cover the infantry during the assault. Its success was obvious. The details varied in the early days, but the principle was never in doubt. As German tactics changed so was the barrage changed to the point where a light bombardment and a heavy barrage would be indistinguishable. Increasing sophistication in infantry tactics, artillery tactics and more importantly combined-arms action allowed a shift back to concentrations. By the end of the war tactics from FAT and FSR reappeared, but with barrages available. What had gone in between, however, was pragmatic. It was pragmatic in a way that bombardments were not, for while there was frequently pressure from high commanders to minimise bombardments there was vastly less pressure to adjust the pace of barrages. Two reasons can be advanced to partially answer this difference. Bombardments

¹²¹ Birch to DCIGS (Harington), 18/5/18, Anstey Papers. The specific circumstances were coming through the AA gunners in England, foreshadowing the 'remustering' of 1944-45.

¹²² AGL McNaughton 'The Capture of Valenciennes: A Study in Co-ordination', Canadian Defence Quarterly, 10:3 (1933), pp279-94.

¹²³ Ibid. p249n8; compare c35% casualties with figures in John Terraine The Smoke and the Fire: Myths & Anti-myths of War 1861-1945 (London: Leo Cooper, 1980), pp44, 47. There was a similar loss rate at Hamel, with surprise and tanks rather than overwhelming artillery. SS218 'Operations ...against Hamel ...'

were the opening act of major battles and planned at high levels. They were thus subject to intense 'political' pressure. Barrages were planned one or two levels lower and it would have been inappropriate for full Generals to intervene. Second, if there had been such intervention, lower-echelon commanders would have a sheaf of local detail to back arguments.

Throughout the artillery did what it could to help the infantry forward, gently remarking when the infantry were not making the best choices, but getting on with the job in hand.

Artillery in Defence

The British army did not intend to win its campaigns by defending. Rather, the BEF was intended to go abroad and bring the King's enemies to heel. FSR of course discussed defensive fighting, but gave it less space than outposts and only marginally more than billeting.¹ Artillery naturally fit into the rest of the defensive battle, and indeed ground was supposed to be chosen to maximise infantry-artillery co-operation. The guns were to be posted where they could command the enemy's infantry movement, dominate enemy artillery, and support friendly infantry under attack. Finally there was to be an artillery reserve to support counter-attacks. This was not reasonable, for if all this was possible it is difficult to see why the British forces would be defending. The very enemy superiority that would force a defensive posture would force different priorities for supporting arms. The weakness of the infantry would require more support, and the only thing that was available for years to come was directly tied support. So in this facet of operations too, the artillery's self-subordination to the infantry held true.

FAT said little more than FSR, not even adding the tactical details it included for attacks.² Covered positions were more likely in defence than attack, but otherwise the artillery fought with the same methods as in the offensive. Counter-attacks were much the same as attacks, perhaps requiring even more boldness in the handling of guns. There was no expectation of a prolonged defence or the majority of the British forces being forced on the defence.

That is of course what rapidly developed in 1914. The first battles of the BEF were defensive, although conforming roughly to expectations, but within five weeks of mobilisation the BEF was spread out defensively along the Aisne. This was not, as FSR predicted, so troops could be concentrated elsewhere for attack but because the whole BEF was on the back foot.³ This was an unforeseen situation, neither side attacking locally, the scale of the war dwarfing anything foreseen in FSR. However, it was not until the BEF moved to Flanders that it learned about defending in trench warfare.

At first this was little different than any other fighting. There were no special tactics for trench warfare and the BEF dug in, then fought in the same old way. Artillery brigades were tied to

¹ §107-110.

² §158-63.

³ Technically it was correct, but the troops so concentrated were not British.

infantry brigades, rendering the concentration of fire more difficult. Artillery was thus wasting its advantage of greater range because of its subordination. The few exceptions to this were remarkably successful, but prove to the rule.⁴ Ammunition shortages were so bad that Haig moved several batteries out of the Salient because they lacked enough shells to be effective, while their presence merely exposed them to losses. Fortunately German offensive tactics - for both infantry and artillery - were no more sophisticated than British defensive tactics. The Germans bombarded an area, then swept forward in mass formations. Whatever defenders survived the bombardment blazed away, supported by all the shellfire that could be arranged. Counter-attacks were ad hoc, for there was neither time nor the means of organising anything greater. It was a hand-to-mouth time for the BEF, with battalions and shells both in short supply. German casualties were immense, eventually so heavy the offensive was abandoned. The BEF held most of its ground and won time but paid in the universal military currency, lives.

During the winter of 1914-15 trench warfare flowered. Previously units had entrenched for purely tactical purposes, expecting it to be temporary. Initially a defensive arrangement, it subtly changed into being defensive but also a way of life, the norm from which everything else differed. There was a tremendous interest in learning the details of trench warfare, especially in the Kitchener Armies. Interest in mobile training *à la* FSR waned as it was clearly useless; trench warfare with its exotic vocabulary held the attention of the public and the New Armies. There was an impatience with generals who were fighting in the old way when the public wanted everything up to date. FG Stone lectured to the Royal Artillery Institution in November 1915 about 'Co-operation between Artillery and Infantry' and the bulk of his remarks were about how trench life was organised, giving his audience detailed examples of the latest practices.⁵

The minutiae of reliefs, working parties and trench life extended back to the supporting artillery. Infantry were organised into sectors, sometimes sub-sectors as well.⁶ A division typically would have two brigades in the line, each with two battalions in the front trenches. Artillery was still organised on a divisional basis, and divided amongst the infantry brigades.

⁴ OH1914v2, pp227, 263 but contrast this with resting infantry having 'their' guns in rest too: p249.

⁵ FG Stone, 'Co-operation between Artillery and Infantry', JRA 42:9 (1916), especially pp462-3. Stone had been plucked from retirement to be CRA of 18th Division, with which he had gone to France but only for a few weeks in the line before relief by a younger officer. Stone was made CRA of another Division at home which he trained before it too was sent to France with a younger CRA.

⁶ J Macartney-Filgate The History of the 33rd Divisional Artillery in the War 1914-1918 (London: Vachers, 1921), p15.

Thus an infantry sector would be covered by an its 'own' guns with the chain of command running straight back but few sideways links. When more guns arrived on the Western Front they were attached to the divisions directly, and frequently divided amongst the artillery groups. Thus a humble Lieutenant Colonel, formerly in charge of three 18pr batteries, might find himself with field howitzers, heavy howitzers, and mountain guns as well as his own 18prs.⁷ This was for the convenience of the infantry, who had a single point of contact for all their artillery requests, but it caused trouble for the gunners. Some brigades became the basis for groups and found their tiny staffs inundated with work, while other brigades had their batteries taken away and nothing to do. Administration suffered and probably only the small amount of fighting to be done in static conditions made it possible. Despite the difficulties, the system of sectors received official backing as late as June 1916, although by then mountain and most heavy artillery had been withdrawn from the divisions.⁸

This system made for very good liaison, but only front-to-back. The infantry battalion in a sector would put up their SOS signal and they would get prompt support.⁹ But the guns tied to the Loamshires might well not fire in support of the neighbouring Mudshires unless the message was first passed up to the CRA by the Mudshires' artillery and then back down by the CRA. Opportunities for maximum effect would almost certainly be wasted through lack of centralised control.¹⁰ Since SOS fire lasted a pre-set time, it might be too long (in case of a false alarm, or if a raid were aborted) or too short (if it were a serious attack). Meanwhile one unit sending up an SOS flare would provoke German response, which might well fall partly on another battalion, who would want their artillery support and the situation could escalate, wasting shells when there was nothing worth shelling. The second pernicious effect was in reinforcing each infantry unit's belief they had an absolute right to artillery support. Ideally artillery fire would be used where it would have most effect on the battle as a whole, not dissipated in supporting every infantry battalion. This was the ideal, but there were reasonable grounds why it did not happen in 1915. First, communications were poor: telephones and even telephone cable were in short supply, so it was not possible to integrate. Second, it was against all tradition and practice and there were even doubts as to the legality of higher artillery command. Third, the infantry battalion in 1915 did not have the integral firepower that it could

⁷ JG Geddes Diary (RAI Military Document 1135), 27/12/14.

⁸ 'Notes on Artillery' WO33/756.

⁹ Originally SOS fire was called 'night lines' on the theory that pre-arranged fire would only be needed at night because in daytime artillerymen could adjust their fire to where it was most needed. It was first used on 29 October 1914. Farndale *Western Front*, p73.

¹⁰ see 'Instructions for Artillery Defence of 7th and 8th Division Front', 30 4/15, WO95 87.

develop later in the war. Lacking prompt artillery support the infantry might not have been strong enough to hold their trenches. All this, reinforced by their own problems and views, kept the artillery operating the same flawed system in tied support to the infantry.

Fighting in the Second Battle of Ypres did not suit the trench warfare organisation into which the BEF had drifted.¹¹ A fairly rigid organisation was disorganised by the initial German advance which forced a return to very much the organisation of 1914. Communications did not work well under either 'system' and eventually the BEF was forced to shorten its line. The defensive failure at Ypres did not lead to any significant rethinking of defensive policy, instead defensive improvements in 1915 tend to be more trenches, not better use of available forces. There are three partial explanations for this: there was no formal defensive policy nor a group to review it; the German advance was eventually checked so the defences had eventually worked; the initial breakthrough was not the fault of the BEF.

Second Ypres was the only large German attack on the Western Front in 1915, so the BEF's defences were not tested more severely.¹² Some development did take place in defensive support of attacks. Few expected the entire German forces on the Western Front to collapse from an Allied attack, so steps had to be taken to protect attacking Allied infantry from counter-attacks, whether immediate or delayed. The attack at Neuve Chapelle featured a 'barrage' intended to delay the deployment of German reserves: a defensive part of an offensive plan.¹³ Otherwise the plan was silent, apparently expecting no counter-attack to be mounted until after British artillery could be moved forward to support the troops in the style of FAT. These were two of the three responses to the problem; the third was purely ad hoc, doing whatever was possible during the battle. The small and futile attacks between March and September did not get so far as to need protection against major counter-attacks. If the British assault only carried a trench or two it was quite simple to support the survivors. Generally the captured ground was in view of observers in the old British front line and reports or SOS signals could be passed back as they would have been in trench warfare.

¹¹ Farndale, Western Front, pp92-103, has considerable detail about various actions.

¹² German success at Hooze in July, a heavily-prepared attack on a small front, showed some of the defects in British defences but it prompted few defensive changes.

¹³ Haig jotted in his diary two tasks for artillery: destroying obstacles and protecting British infantry against counter-attack. This suggests a simple faith in the superior qualities of British infantry and suggests why an infantry-supporting barrage was not developed sooner. Diary, 6/1 15.

The battle of Loos was the largest, best-planned and most successful British attack of the war so far. It envisaged some partially defensive measures built into the bombardment as well as more active steps to support troops against counter-attacks. For the first time harassing fire was organised to interdict German reserves before the battle; unfortunately due to the shortage of guns and shells this had to be dropped on the day of the assault. Instead extra care had been taken to improve reporting of counter-attacks from the British front line. Furthermore, considerable care had been lavished on preparations to move the British guns forward to support the advancing infantry. Routes had been allocated and special trench bridges provided so guns could move up, to provide both offensive and defensive support. The guns would fire planned barrages for 80 minutes, then advance under the command of the divisions.¹⁴ Unfortunately none of this solved the communications and organisational problems. By moving, the advancing guns put themselves out of communication; they could not support attacks or defence out of sight, unless they could organise a chain of orderlies to carry messages. Moreover, infantry in need of support against a counter-attack was not likely to be readily able to pass word back.¹⁵ German defensive artillery fire was intended to divide the battlefield, separating the forward British infantry from both artillery support and infantry reserves. Furthermore, if word did get back of a counter-attack the British command structure was not sufficiently sophisticated to rapidly mass fire.

German reserves were too small for major counter-attacks at Loos, and the Germans had adopted an almost complete defensive stance along the Western Front. However, in 1916 this was changed, featuring attacks, some small but also the battle of Verdun. The BEF did not suffer attacks on the scale of Verdun but the Germans made several attacks with limited objectives. These were a specialty of the Germans who had begun using large masses of artillery to blast the way clear to an objective in October 1914.¹⁶ In 1915 most German attacks had involved more than simple artillery superiority- mines, gas or flamethrowers were used. This confused the issue, making it debateable what had been the main cause of the German success. In 1916 the small attacks continued, and again gunners avoided most of the blame. The German massed artillery drove the British back, and there was little that leadership could do.¹⁷ There was some small willingness in the BEF to remove senior officers who failed in

¹⁴ I Corps Operations Order No106 (20 9 15), WO95/619.

¹⁵ Farndale, Western Front, p126 gives the situation for 9th (Scottish) Division.

¹⁶ Bruce I Gudmundsson, On Artillery (London: Praeger, 1993), pp44-50.

¹⁷ When in May 1916 the Germans pushed down Vimy Ridge, Haig sent his MGRA to better co-ordinate the guns already present. Diary, 22/5/16. The question of promotion and replacement of artillery officers is too complex to be dealt with here but seems to have been arbitrary and inconsistent.

defensive operations: between Second Ypres and the Kaiserschlacht there were only three cases of officers clearly removed for failure in defensive operations.¹⁸ Sir Horace Smith-Dorrien was sent home in disgrace after requesting a withdrawal around Ypres; Sir Henry Wilson was relieved when his Corps lost ground on Vimy Ridge in May 1916; and after the action of Hooze the CRA of 3rd Canadian Division was removed in June 1916. However, the cases of Smith-Dorrien and Wilson contained elements of army politics, since each was detested by his commander in chief, French and Haig.¹⁹ Nor was there any purge of more junior infantry officers whose units had failed: it appears no Brigadier-General or higher was replaced except for wounds.²⁰ It seems to have been more hazardous for an officer to fail when attacking rather than defending. Probably most hazardous, and with the least cause, was failing to hold ground against a counter-attack.

There was also little clear policy on the defensive use of artillery. The 'Artillery Notes' series dealt in detail with various aspects of attacking but the pamphlet 'Artillery in Holding the Line' was published in sufficiently small numbers that none have survived. The title alone suggests a passive or at least rigid defensive mentality. Its contents can be surmised as more of the same, approving and elaborating the ad hoc system that had grown up in 1915. 'Sectors' were official policy, SOS lines were normal.²¹ There was no modification of defensive measures to reflect the improved command system, or any consideration of changes in the infantry. This suggests a remaining compartmentalisation of thinking, since the command system had been improved in order to support attacks. Defence became surer as the infantry received more grenades and machine-guns. With their growing internal firepower did they need so much artillery support? Should it have been provided the same way?

During the Somme fighting there were many German counter-attacks, so the protective aspects of barrages were highlighted. The protective value of a creeping barrage had been foreseen in 'Artillery in the Offensive' which spoke of 'stopping any attempts at counter-attack'. Beyond this offensive-defence there were no particular innovations. SOS signals were still the main way of requesting artillery support and attacks still outran their communications, thus making

¹⁸ Compare with unit commanders' removal in Tim Travers, The Killing Ground: The British Army, the Western Front & the Emergence of Modern Warfare, 1900-1918 (London: Routledge, 1987), chapter 1.

¹⁹ Herbert Plumer's position in early 1916 was shaky, but he survived in command of Second Army.

²⁰ Methodology for this admittedly brief survey was simple: comparing a division's battle honours with the nominal roll of commanders in Becke's series of Orders of Battle.

²¹ What material that survives, notably 'Notes on Artillery' (6/16, WO33/756) supports this. It discusses sectors, night lines and allotted batteries as the rule, then moves on to ways of harassing the Germans.

themselves vulnerable. A new opportunity developed for co-ordinating defensive fire in an attack, namely improved RFC-RA liaison. 'Zone calls', first developed to deal with German artillery, quickly expanded to deal with infantry attacks. Fear underlay most of the instructions in that the artillery was called upon to stop the counter-attacks by itself- the infantry was not accounted strong enough to fend off attacks, either alone or with support.²² The principle was broadly that of the SOS call, merely extended into the attack. There were some encouraging signs, such as protective barrages being lifted to allow the infantry to put out patrols, rather than simply digging in behind a curtain of shells. Against German deliberate counter-attacks, there were no significant improvements. SOS fire was the main artillery response and whilst useful, other things might have been done.

For the BEF 1917 offered a variety of defensive lessons. GHQ had not updated 'Artillery in Holding the Line' so defence in trench warfare was little changed. The re-organisation of field artillery, with divisions losing roughly one-third of their guns, was mainly done to facilitate attacks, but defence was considered. Divisions retained two brigades which tallied neatly with the two brigades kept in the line. Artillery organisation was thereby simplified, allowing divisions to drop 'groups'. Also, divisions with only 48 guns had enough defensive firepower. This was mainly recognition that the infantry had far more firepower (and fighting skill) than previously, but it also took into account the greater firepower the artillery could generate.²³ Before 1917 there was no real 'yardstick' for apportioning artillery in the defence, as there was for attacks. Now an 18pr per 200yds of British front was considered adequate because the Germans would be as incapable of opening a surprise attack as the British. GHQ did start the move away from SOS fire into counter-preparation, but did so with the comfortable assumption the Germans would attack in the same style as the British, following prolonged bombardment.²⁴ This they would decline to do and GHQ's artillery priorities had to be revised before the onslaught of 1918.

There was little defending to do whilst advancing to the Hindenburg Line. Allied forces advanced slowly expressly to avoid offering counter-attack opportunities; consequently the Germans tried few attacks. The only significant instance was at Lagnicourt, where guns had

²² It is important to note this was not universal, and CDS50 ('Tactical Notes', 31/7 15) suggested allowing the Germans to assemble, then inflicting heavier casualties rather than dispersing counter-attacks before they formed.

²³ This is largely tribute to the shell factories: guns without shells are useless, as at First Ypres, but guns with ample shells can develop their full firepower.

²⁴ OA337, 14/1 17, WO95/519.

been moved up to support an attack to a flank.²⁵ The Germans mounted a surprise attack, penetrating an extremely thin infantry screen to temporarily capture several batteries. However, other batteries stood their ground (doing great execution) and the Australian infantry regained the lost ground, winning four Victoria Crosses in the process. It was a small action with enough differences from the norm that deductions were difficult to make. Nor was the BEF looking towards mobile warfare; trench warfare had become the standard and actions like Lagnicourt were considered the exception that proved the rule. Indeed, for trench-warfare fighting Lagnicourt held few lessons and the BEF was not expecting open warfare.

The defensive aspect that blossomed during 1917 was protection against counter-attacks. 'Artillery in Offensive Operations' called for the guns to prevent the 'assembly and approach of counter-attacks of all sizes'.²⁶ Typical of the prescriptive, centralised style of operations in the BEF, plans were to be drawn up ahead of time for protection during the infantry's consolidation. There were occasional differences from this style, as Ivor Maxse telling a batch of company commanders to push as far as possible, 'Hold what you can with rifle fire. We will meanwhile organise artillery fire to help you'.²⁷ Protective barrages were also to be fired 'as long as it is required by the infantry', showing the flexibility just entering attacks was not extended to defence. As German tactics shifted ever further away from rigid defence, so the British had to deal with more and more German counter-attacks.²⁸ Techniques begun in 1916 were refined, such as the use of aeroplanes to pass zone calls. This was greatly aided by the improved command system in 1917, which facilitated switching artillery to the most important target. The German system was occasionally too rigid, with counter-attacks by time-table proving especially vulnerable to British shellfire. German reliance upon counter-attacks meant the BEF developed special tactics. These included filling valleys with gas, leaving some routes open until the day of battle and then shelling them, or simply cratering routes where German reserves moved. There were also debates whether to allow the Germans to assemble before shelling them (thus increasing the casualties inflicted) or dispersing counter-attacks as soon as they were detected. However, this was a peripheral argument: the basic principle was to provide maximum protection to the infantry, with large numbers of shells.

²⁵ OH1917v1, pp370-7.

²⁶ SS139 4, 2/17.

²⁷ Maxse Papers, IWM, f35. This was close to the German idea of pressing an attack as far it could go; those who criticise the BEF for not following this route should contemplate the results of this instance when it did.

²⁸ see GC Wynne *If Germany Attacks: The Battle in Depth in the West* (London: Faber & Faber, 1940) (hereafter Wynne, *Battle in Depth*) for an account of German defensive tactics.

The German attack at Cambrai was the first large attack made upon the BEF since the spring of 1915. Many of the circumstances were similar to the smaller attack at Lagnicourt: surprise, a thin infantry line, guns primarily employed supporting neighboring infantry, inadequate communications. Again guns were over-run but heroic gunners²⁹ and British counter-attacks saved the day. However, the new German tactics had yielded a greater success than at Lagnicourt, and had shaken GHQ. The Germans were not thought capable of such an attack, and while much of the blame was shifted onto the shoulders of the infantry, there was food for thought.³⁰ This time the experience was carefully examined for lessons, because the BEF now had to settle onto the defence for the first time since the winter of 1914. Third Army looked more at the fighting around Bourlon Wood - where the line had held - and decided artillery in sufficient density to support an attack could also support the defence.³¹ Yet this would be little comfort where there was only an ordinary amount of artillery, not enough to back an attack.

In the new circumstances, GHQ and Armies took firmer steps than previously to organise defences and establish a standard policy. Over the winter 1916-17 several armies had laid down their own policies, focussing more on staying aggressive and maintaining the initiative than on minimising casualties and sparing time for training. Fifth Army alone had fired over 2 million rounds despite never attacking in more than battalion strength.³² Now the whole BEF needed a quiet front to allow training, reduce casualties and to improve the defences. Artillery policy was heavily affected. While previously artillery had been expected to be aggressive, harassing the Germans and firing on any activity, now live-and-let-live operated for the guns as well as the infantry.³³ Even the normally aggressive Australians were restrained, 'as it is not desired to stir the enemy into activity without good cause'.³⁴ In contrast to their previous year, Fifth Army ordered no harassing fire and no bombardments.³⁵ It was recognised that some

²⁹ the first artillery VCs since 1914 were awarded to Sgt CE Gourley and Lt STD Wallace. Wallace and only five men kept two guns in action for two hours under heavy fire; the men all received the DCM.

³⁰ The Corps Commander was, after a short interval, replaced.

³¹ WO158/316.

³² 'Report on the Advance of the Artillery of the Fifth Army from February 24th to March 30th 1917', Uniacke Papers VII 1.

³³ This was especially true where British troops relieved the French. Continuing the French *modus vivendi* was considered the best way to disguise the changes from the Germans; III Corps BGRA Diary (WO95/692), 26/1 18.

³⁴ ANZAC Corps BGRA Diary (WO95/994), 3 2/18.

³⁵ Fifth Army Artillery Instruction No83, 27 12/17, Uniacke Papers VII 3.

offensive action would be needed, and destructive shooting did continue, largely at German artillery.

The change in artillery activity was the fruit of a new pamphlet on 'Artillery in Defensive Operations'.³⁶ This dealt with all facets of artillery defence, from underlying principles through tactics to advice on how to disable a gun about to be captured. It drew together the trends of 1917, including limiting SOS fire and supplementing barrages with counter-preparation - shelling the enemy as they prepared, before a defensive barrage was even necessary.³⁷ This was elaborating GHQ's own instructions from early 1917,³⁸ but even before GHQ could promulgate the new policy various Armies were doing the right things.³⁹ There was some delay in circulating 'Artillery in Defensive Operations' but Birch was urging Armies to operate according to the 'ABCs' or first principles.⁴⁰ The policy also drew in trench mortars, and machine-gun barrages - tools which had been integrated into creeping barrages in the spring of 1917. Defensively areas would be covered by artillery or MGs depending which would provide better coverage.⁴¹ This was the final step in removing the infantry's 'right' to artillery support. Established by default with the first 'night lines' the idea was obsolete by mid-1917 (at least for quiet sectors) but had never been revoked. British infantry were flatly told that 'repulse of assaults' was only third priority, behind 'destruction of the enemy's fighting power' and bombarding communications. Mere retaliation for hostile shelling was obsolete; now its twin passed away too.

In common with the whole command system of the BEF the policy assumed considerable centralisation. Centralisation theoretically leads to efficient use of scarce resources, but it relies on adequate information and the rapid passage of that information. The Germans took

³⁶ SS139/7, 2/1918.

³⁷ Counter-preparation might differ little from SOS, being fired whenever the 'wind was up'. III Corps BGRA Diary (WO95 692), 30 11 & 11 12 17.

³⁸ OA337; see n25 above.

³⁹ Second Army, 18/12/17, WO95/276; Montgomery-Massingberd Papers, LHC, f61 '4th Army Policy on the Army Front for 1918', 20 1 18.

⁴⁰ Second Army claimed (WO95/277) it was issued 21/3 18; some units may have waited for copies but the ideas had been implemented earlier. Birch toured Ypres 9 2 18 and discussed the artillery defence of salients while SS139/7 awaited Haig's signature. RA G 5, memo to CGS, 10 2/18, Rawlins Papers, f12b.

⁴¹ Later in 1918 this was taken further, GHQ ordering some sectors be left without support instead of being thin everywhere. letter, CGS to Armies, 20/7/18, WO95/902. See also Bailey, *Field Artillery*, pp145-8.

stringent measures to preserve secrecy, measures which worked despite British probes.⁴² Passing messages in WWI was never easy, and reliance upon centralisation invited trouble if the system broke down. At the tactical level, one battery later reported 'the more [telephone] wire you give us the more Huns we shall kill', while a Brigade commander wrote the effort of digging gun positions would have been better spent burying cable.⁴³ The Germans took quite sensible measures to shell British HQs, telephone exchanges and other key communications points; they also built more flexibility into their tactics and were just plain lucky that the weather hampered the British defence. All this contributed to the collapse of central organisation in British resistance and turned the March Offensive into an enormous 'soldiers' battle'.⁴⁴

During the Kaiserschlacht (or 'Michael' offensive) very little went according to plan for the BEF, and it was no different for the artillery. The Germans knew most battery positions and gassed them heavily which greatly reduced the effectiveness of the coughing, half-blinded gunners struggling in their masks. Thanks to the mist and German shelling of telephone lines, some batteries never got a signal to fire or saw SOS flares. Communications collapsed in the first few minutes, fatally compromising any chance for proper counter-preparation fire.⁴⁵ Instead isolated batteries and guns⁴⁶ fought their own battle, frequently firing over open sights until ammunition was exhausted, or providing a barrage that was manifestly too thin. Reserve batteries were the most useful of all, as the Germans had not identified their positions and they were also trained for mobile operations.⁴⁷

The tale of the first ten days is replete with German infantry being held off by British guns alone but, as with so many local successes by the infantry, a flank was turned somewhere

⁴² Fifth Army tried stratagems such as shelling bridges and roads just behind the German line; repairs would indicate offensive plans; III Corps BGRA Diary (WO95/693), 14/2/18, VII Corps BGRA Diary (WO95/812), 12/3 18. Why the Germans achieved surprise is beyond the scope of this research. There were strong indications the Germans intended attacking near St Quentin, but also on more important sectors.

⁴³ WO158/343; WHF Weber, 'With the Field Artillery from Trench to Open Warfare on the Western Front', *JRA*, 45:11&12 (1919), p358, which is also an extremely interesting account.

⁴⁴ Farndale, *Western Front*, pp262-279, has many accounts of the fighting while Martin Middlebrook, *The Kaiser's Battle: 21 March 1918, the first day of the German Spring Offensive* (London: Penguin, 1983), concentrates on the preparations and the first day.

⁴⁵ VII Corps, facing the full brunt of the German attack, signalled the heavy guns at 0455 to fire on German trenches, but for most batteries it was already too late. VII Corps BGRA Diary (WO95/812), 21 3 18.

⁴⁶ Single guns would have been forward for a variety of reasons, to snipe at German movements, or pretend a battery position was occupied but largely as anti-tank guns. Having introduced tanks to the world, the BEF was well aware how much of an aid they could be in an attack.

⁴⁷ RHA batteries too proved the worth of their mobile training.

and the whole line had to pull back. Great bravery was shown, but there was no opportunity for artillery to have more than local effects on the battle. Liaison became increasingly difficult and at least one Corps re-organised its artillery to cover sectors completely divorced from those covered by infantry divisions.⁴⁸ This was an important step away from uniform defensive barrages and towards destructive concentrations. While not operating independently, artillery was being used to influence the whole battle by concentrating on key sectors. Some infantry might lose local support, but decisions on where to concentrate artillery were made by formation commanders, not on artillery grounds beyond the purely technical. As was only natural for a Commander-in-Chief, Haig did his utmost to encourage the troops and learn from the battle; he visited many HQs and usually took Birch with him.⁴⁹ Beyond absorbing the lessons themselves, there was little that could be done to affect the fighting spreading across the old Somme battlefield. Birch did spot the right lessons, the necessity to use heavy artillery immediately or not at all, and the crying need for the RFA to train in mobile warfare.⁵⁰

Heavy artillery had a different set of problems. Not only were many heavy guns captured, but the survivors were slow into and out of action, so they had to be withdrawn from action earlier than field artillery or even more would be captured. It was estimated that if the front moved faster than three miles per day heavy artillery could play no useful role.⁵¹ Further reducing effectiveness of any available heavy artillery was lack of targeting information. Heavies usually fired on specific targets beyond the field artillery barrage; with enemy dispositions poorly known the big guns could contribute little beyond random shelling.

Most histories present the Lys offensive as the second German offensive in 1918.⁵² This however ignores the comprehensive British defensive victory along the Scarpe on the 28th March (to the Germans the 'Mars' offensive). This was a victory won largely by firepower and there are strong signs that GHQ suspected the offensive and took steps to maximise British firepower rather than adding manpower. Haig sent Birch, who had visited most of the Corps

⁴⁸ XIX Corps of Fifth Army; OH1918v2 p95.

⁴⁹ Haig Diary, March-April 1918.

⁵⁰ See, for example Third Army's lessons, WO95/370, 7 5/18. Fifth Army also reacted while the retreat was still underway, making such points as the short German bombardments meant the RA could use more intense counter-preparation themselves. III Corps BGRA Diary (WO95/693), 6&8/4/18.

⁵¹ 'Heavy Artillery XVth Corps Report on Operations 9th to 17th April 1918' (nd), WO95 927.

⁵² This is not limited just to those derogatory of the BEF; John Terraine To Win A War. 1918, The Year of Victory (New York: Doubleday, 1981) does not mention the 'Mars' battle and even the OH (1918v2) gives it only 17 pages.

involved in the Kaiserschlacht, to advise Third Army on defensive artillery measures.⁵³ The key suggestion was to keep a central reserve of heavy artillery, under command of the Army MGRA. This idea does not seem to have had much effect, largely because Birch only arrived the day before the German attack. Rather, tribute must be paid to the fighting qualities of the British infantry, but their close artillery liaison should not be forgotten.⁵⁴ RFA shell expenditure averaged 750 rounds per 18pr in a single day, one of the heaviest in the War; heavy guns engaged German infantry at ranges down to 600yds.⁵⁵ Counter-preparation worked well, barrages worked well, everything showed just how good British defensive measures could be. The four British divisions lost only a few trenches and no reserves were called upon until evening, to relieve tired units. A German history reports the attack failed 'because of the great disturbance caused by the British artillery fire' and 11 divisions had been stopped by four.⁵⁶ The key point was forewarning of an attack, allowing counter-preparation to be fired when the Germans lacked time to recover from its effects.⁵⁷ Fire too soon and the British batteries would be revealed (for the Germans to bombard at leisure) whilst the German assault troops would not yet be in the trenches. Fire too late and the assaulting troops would have left the trenches and the shellfire would 'hit the air'. The BEF learned that counter-preparation had to be as intense as offensive barrages, not a desultory barrage.⁵⁸ It also was not a gunner decision but one that had to be taken at the highest possible level.

By the time the third German offensive (Battle of the Lys or 'Georgette') was launched, the BEF had absorbed even more lessons. German success was largely due to the disintegration of the Portuguese forces; some British divisions stood their ground as well as those at Arras.⁵⁹ Because the area had strategic importance the line was more strongly held; more reserves were also available. Surprise must have played a role in the German success because Second Army had enough guns - and Mars had shown the technique successful - to disrupt an offensive before it began. Despite the British strength, once the Germans had opened a hole the British

⁵³ Haig Diary, 27/3 18. This mission appears neither in Third Army operations reports nor in GHQ-Third Army correspondence. It is, however, powerful evidence the German attack was anticipated.

⁵⁴ The front here had not moved for almost a year, allowing the perfection of the fixed defences. The terrain also favoured the British and German tactics were poor.

⁵⁵ OH1918v2 p73.

⁵⁶ quoted in Farndale, Western Front, p275.

⁵⁷ German preparations were also not as thorough as before 'Michael'.

⁵⁸ XV Corps BGRA Diary (WO95 925), 31 3 18.

⁵⁹ Among these was 55th (West Lancashire) Division, which had already experienced the new German tactics at Cambrai. This may have affected their defensive plan.

line had to retire to avoid being outflanked, and the lessons of mobile operations were the same as further south.⁶⁰ Heavy guns could not function if they had to move far; mobile field artillery reserves were vital; German attacks could be stopped (sometimes) by direct fire. Birch appeared at Second Army HQ on another of his missions, this time to ensure the artillery had an independent organisation on the flanks to cover any retirements necessary.⁶¹ Similarly, there was now freedom to consider whether it was, or was not, justified to risk guns in order to inflict maximum casualties whereas previously every effort had been bent towards preserving the guns.⁶² Also to be balanced was CB fire vs. killing German infantrymen: whilst valuable when no attack was apprehended, CB fire led to batteries being known to the Germans and the guns neutralised during an attack.⁶³ These were nail-biting decisions for the General Staff and commanders but the artillerymen made suggestions, not decisions. By this time there was ample general experience and growing defensive experience in the BEF so beyond technical details artillery would have little to add.

All this had been clear from the fighting around the Somme and GHQ had organised an inquiry into the Michael fighting, even before the line had stabilised.⁶⁴ Corps, divisions, brigades and even batteries were called upon to give their account of the battle, not filling out a form that would shape comments nor, crucially, in any sort of witch-hunt to assign blame. GHQ were genuinely seeking to find what had gone right and what had gone wrong. After the German offensive burned out, the process of learning lessons was repeated with all echelons of Second Army quizzed for their experiences.⁶⁵ There was little new to be learned from Georgette but GHQ was not slow to spread what there was. 'Notes on Recent Fighting' leaflets appeared almost while the Germans were attacking; however they must have been more useful for the rest of the BEF than among the troops in battle.

Georgette was the last major offensive the BEF had to withstand. While IX Corps was attacked on the Aisne, it was part of a French Army and was operating under to their orders. Despite the heavy casualties suffered by IX Corps, and their vastly different circumstances, it was still worth checking what happened. GHQ issued more 'Notes on Recent Fighting' about

⁶⁰ See the very thorough 'Report on Operations Undertaken by IXth Corps between 9th and 21st April 1918', 20 5/18, WO95 841.

⁶¹ Haig Diary, 13 4/18.

⁶² Reserve Army Artillery Circular No1 (7 4/18) WO95/521; Haig Diary 18/4/18; XIII Corps BGRA Diary (WO95 902), 28/4/18.

⁶³ JHH Jones to Edmonds, 23 2/28, CAB45/186. Jones was CBSO of XVII Corps in 1918.

⁶⁴ XIX Corps were asked on 6 4/18, well before the line had consolidated. Sandys Diary, 6/4/18.

⁶⁵ parts of IX Corps' report are printed as Appendix 17 to OH1918v2.

the Aisne battle, focussing on German tactics because there was little to be learnt from the French ones.⁶⁶ The bulk of the BEF spent May, June and July merely holding the line, but this was not the relatively passive trench warfare of 1915-17. Raids and patrols were even more common than earlier in the war. Two reasons can be advanced for this: British divisions were absorbing large drafts and had to give them some experience, and as always to maintain the initiative. The raids were more successful than ever before for two main factors: German defences were weaker; and the Germans had combed their infantry to produce some good divisions. The first was true since on most of the line the Germans merely occupied the line of furthest advance, hastily entrenched, the second meant the rest were weaker and knew they were second-class.⁶⁷ Thus the British infantry truly did achieve a moral superiority across No-Man's-Land, and their prisoner 'bags' were proof.

GHQ sensed the shifting balance on the Western Front and, while cautious as long as the Germans had a large reserve, adjusted artillery policy. Over the winter the RA had been reigned in, to avoid provoking the Germans. Now unbridled - but intelligent - aggression was the order of the day. Destructive CB work, short but heavy bombardments of trenches and thorough harassing fire were organised up and down the line.⁶⁸ Every technological aid was called upon, with Sound Ranging effective against hastily-emplaced German batteries; the RAF dominating the skies, watching for any movement; calibration allowed sudden concentrations of fire. CB fire was especially important, and relentlessly ground down the German artillery. Leaving aside the guns captured, German artillery losses from British CB alone ran at about 10% per month in this period, a completely unsustainable rate.⁶⁹ The constant aggressive fire was co-ordinated by experienced staffs who had done it all before under less favourable circumstances. Now their techniques were given the opportunity to flourish and did so. The Germans withdrew in several sectors because the British artillery was making salients and forward areas too expensive to hold. This was a major achievement, forcing a withdrawal without an attack, and it shows the level of superiority the RA had achieved.

⁶⁶ Some lessons could be picked out, for instance German gas tactics which depended upon types of gas, not differing defences. The BEF knew enough to ignore some misleading lessons.

⁶⁷ This was a problem the Allies had for much of the war, and something the Germans had spent much of 1916-17 trying to avoid. See Wynne, *Battle in Depth*, on the Germans yielding tactically useless ground. Even during Georgette GHQ had time to prompt Third Army to take this advantage; WO95/369, 17 4/18.

⁶⁸ Occasionally Armies suggested more orchestrated destruction for artillery in trench warfare, as Third Army in July 1917, strongly deprecating retaliation in favour of organised destruction. III Corps BGRA Diary (WO95 692), 17/7 17. Third Army had to remind its Corps: WO95 365, 10 8/17.

⁶⁹ In September XV Corps examined the German gun positions on ground recently re-captured and found 70% of their shoots had been at least 'quite effective'. WO95 925, c28/9 18.

Once the Allies shifted onto the offensive there was virtually no more defensive fighting for the BEF. Naturally trench warfare persisted on some sectors until the offensive spread up and down the line; First and Second Armies were harassing and raiding the Germans whilst Fourth Army was rounding up prisoners in myriads. However, the defensive offensive measures in barrages disappeared. They did not dwindle, they disappeared as soon as it became clear major German counter-attacks were a thing of the past. Such counter-attacks as took place were modest, tactical affairs and could be handled by the artillery in close support of the infantry or by direct communication with supporting batteries. Here the reduction of German artillery was a key element, because less German shelling meant a lesser risk of telephone cable being cut.⁷⁰

So at the end of the war the artillery had changed their defensive role with the concurrence of the rest of the army, but only after having spent years not achieving their potential. Before the war there was no particular defensive doctrine for the artillery, as indeed there was not for the British army. Defence was a condition that might occur, but nobody need overly concern themselves. The principle of economising men for action elsewhere was clear but the British army had a great many clear principles, some of which overlapped, and a lack of clear guidance on how to implement the principles. Thus when trench warfare developed at first it took the shape of mobile warfare, only entrenched. Artillery kept its same role to the infantry which was no longer entirely appropriate. While there were extenuating circumstance and very gradual improvement in defensive methods, artillery was not well integrated. Despite the problems, as soon as the BEF put its mind to defensive policy it developed a successful one. 'Artillery in Defensive Operations' saw a more flexible and better-integrated role for artillery in the defence, paradoxically by freeing it of total support for the infantry. Yet freedom from the tyranny of the front-line battalions did not mean the artillery doing their own thing on the battlefield. Artillery firepower formed the framework for the defence and the results proved the concept. This was an outstandingly successful integration of the artillery into an overall battleplan, recognising, as the previous total and willing subordination had not, unique abilities. Nor were the few remaining months of trench warfare wasted: the BEF established a dominance that paved the way for and continued into its attacks. One role that sprang up was actually protecting attacking infantry against counter-attack. Before the war it was broadly expected a successful assault would have shattered enemy morale, precluding counter-attacks; this did not take into account the scale of a European war. The problem was never completely solved, although many attempts were made. Largely it was a communications problem and could not be solved until tactical radios were available that could carry voice messages, rather than just Morse code.

⁷⁰ eg Fourth Army's experience on 19 9 18, WO95/439.

Training and Schools

Just as an army has plans for how to fight, that is how it trains. The Royal Artillery was well trained before the war, and the training well suited to the anticipated fighting. When modern warfare proved different from expectations it was already too late to retrain the artillery, let alone the whole army. Restarting from scratch whilst fighting a war would have been impossible. Nor was it tried. Artillerymen were not satisfied with their ability to do their job, but chose to make gradual improvements, albeit as rapid as possible, rather than start afresh. Progress was always within the pre-war view of artillery as a supporting arm. Wartime training anticipated a Second World War comment of Montgomery's, that the artillery must first train itself and then train the infantry to use the artillery properly.¹

Before the war the British army was scattered across the Empire and the British Isles, which greatly affected its training. Training was organised in two seasons, one for making the men into gun detachments, the other for moulding the battery as a whole. Another aspect was taking part in manoeuvres, but these did not happen every year, nor were all units involved. Individual training could be done in barracks, but firing could only take place on the ranges. There were several areas in the British Isles, most of which were only barely large enough. This made practice camps rather ritualised, since battery positions were few and targets popped up in the same places year after year.² Problems were compounded by the small ration of shells allowed for firing annually, no more than 600.³ It all meant a gun would fire perhaps one round per 'tactical situation' which gave the whole proceedings an air of unreality.⁴ One step taken at some practice camps (but not all) was joint tactical exercises with the infantry;⁵ again these could be mere ritual. The guns had to stop firing just when the infantry reached the crucial moment of assault and at times the gunners preferred to spend their time on abstruse gunnery rather than combined operations.⁶ Comparing the expectations against the events of the bulk of World War I, individual skill-at-arms was more important than the soon-outdated

¹ Bidwell, *Gunners at War*, p134.

² SCM Archibald papers, IWM, p69.

³ At one point 60pr batteries were pleased to see a reduction in their allowance, because it meant replacing feeble practice shells with the real thing. Headlam, *History*, p220.

⁴ Bingham '1913 Practice Camps', p482.

⁵ encouraged by the 'affiliation' of infantry and artillery brigades from 1907. Headlam, *History*, p168.

⁶ FR Bingham 'Practice Camps, 1912, and the lessons to be learned from them', *JRA* 39:11 (1913), p422; Haig to Kiggell, 15 6/11, Kiggell Papers 1/7, LHC.

tactical training of practice camps, emphasised speed into action and rapidity of ranging.⁷

It should be noted none of these comments can be uniform because there was no tactical uniformity within the Royal Artillery. Batteries trained separately, brigades had different ideas and divisions were equally diverse - and many batteries were not even assigned to divisions.⁸ There was no central school, although some senior officers wanted one.⁹

As the Royal Regiment was divided in two branches, Mounted and Dismounted, so training was divided. Garrison Artillery had more time for individual training since their units travelled less and did not have to spend time at stables duties. This may have improved their gun drill but their shooting practice was even more restricted than their colleagues'. Targets on siege artillery ranges were, if anything, worse than those for field artillery, never including the 'obstacles' which would be one of the major wartime targets of siege guns.¹⁰ Some very advanced ideas developed in the RGA included calibration of guns, so they would be more accurate with their first shot, but here too the lack of a central training authority meant it was an individual crusade by Walter Bland.¹¹ Siege artillery was specifically criticised for slow moving and slow firing, harsh treatment given that civilian carters had to be hired for manoeuvres and heavy guns always fire more slowly than lighter ones.¹²

Manoeuvres should have put the final polish on training, but it must have been difficult when half-strength batteries were used and concern about crop damage was as great as that about more martial activities.¹³ The nature of any joint training was of artillery adjusting itself to the infantry or cavalry, who did earn some criticism for not co-operating but leaving it all for the artillery.¹⁴

After the outbreak of war, the artillery (as with the whole army) was faced with two problems. First was expansion, training larger numbers of men than had ever previously been contemplated. In this regard the artillery, like other technical arms, were worse off than the

⁷ The decline in standards of officers and NCO (particularly battery commanders and BQMSs) was a perennial complaint of senior officers. See Anstey galley proofs, pp193-4, for Birch's laments.

⁸ Divisional CsRA did not inspire universal respect. RH Towell later wrote that FDV Wing 'may have given the impression he knew little about Gunnery detail'. CAB45 199

⁹ eg Herbert Uniacke. Anstey Papers, RAI, letter Birch to Horne, 30 10 18.

¹⁰ Headlam, *History*, p249.

¹¹ RP Benson to Edmonds, CAB45/116.

¹² Memorandum on Army Training during the Collective Training Period, 1913. I am grateful to Mr N Evans for bringing this and several related Memoranda to my attention.

¹³ Sir Aylmer Hunter-Weston papers, NAM 6503-39-18, 'Remarks on 1912 manoeuvres'.

¹⁴ 'Memorandum on Army Training, 1912'.

infantry.¹⁵ Specialist equipment had to be provided and guns manufactured before anything more than close-order drill could be taught to freshly-minted gunners. Second was the problem of changing techniques. As the war progressed new methods evolved which had to be spread around the artillery to bring all units up-to-date, including of course the brand-new ones. Hesitantly, steps were taken to cope, steps which by the Armistice had produced the most advanced artillery arm of the war.

The first problem of expansion was providing equipment for training. Training was hampered by the shell shortage of 1915, but probably more by the lack of guns. New Army divisions had very few guns, often for months. 13th Division eventually procured one gun per battery but conversely had 'no harness except for a few nearly worn out civilian sets which enabled one battery per brigade to turn out 8 vehicles once a week'.¹⁶ 18th Division did its unit training in England with a very few guns, fired some borrowed guns a few times on Salisbury Plain and only received its own guns at le Havre.¹⁷ So extreme was the shortage of real guns that some captured German guns were sent back to England for the New Armies to practice with - they were at least better than wooden dummies.¹⁸ The supply of horses also caused problems, one Division assembling over 2,000 but most with ringworm.¹⁹ One RFA brigade simply decided not to overwhelm its raw recruits, and only taught 'so much of the team work required in a battery as will permit the whole work of the battery to carry on'.²⁰ There was also the question of who would teach the new gunners their trade. It was one thing to teach men gun drill - although difficult enough in the absence of guns - but another to teach gunnery and artillery-infantry co-operation. This problem was not helped by the CsRA of the New Army divisions, almost all of whom were retired officers 'dug-out' in the emergency. Ivor Maxse was relatively lucky with the CRA he got for 18th Division, but still wanted officers, even as junior as major, to be sent back from France because they had up-to-date experience.²¹ A

¹⁵ Peter Simkins' excellent Kitchener's Army: The Raising of the New Armies 1914-16 (Manchester: Manchester University Press, 1988) unfortunately does not cover artillery training in detail.

¹⁶ Sir Webb Gillman papers, RAI military document 1161, box 2, f11.

¹⁷ HH Hemming papers, IWM

¹⁸ Director of Ordnance Services, 31/10/14, WO95/58. A few French black-powder weapons were also provided for the second-line Territorials. Becke, Order of Battle part 2B, (London: HMSO, 1937), appendix 3.

¹⁹ HW Wiebkin A Short History of the 39th (Deptford) Divisional Artillery, 1915-1918 (London: EG Berryman, 1923), pp5-6. (henceforth Wiebkin, 39th Divisional Artillery)

²⁰ OC Williamson Oswald, Sixty-One, or how some wheels went Round (London: HJ Drane, nd.), p51.

²¹ Maxse papers, IWM, f11 1. FG Stone was 57 in 1914, was *psc* and had retired earlier that year. Some CsRA were in their 60s. See f11 2 for examples of artillery training in 18th Division which seems to have been largely dominated by Maxse rather than Stone, who may have been wise to get out of the way of such a fire-and

variety of official publications came back from France so the new divisions would not learn the wrong things.²² Some of these also tried to explain new techniques, but it is debateable how much use they were to officers still grappling with the rudiments.²³ There was also a cottage industry of books and pamphlets by serving or retired officers, purporting to tell new gunner officers all they needed to know.²⁴

The RGA had perhaps even more problems, as they were more technical and their large guns were slower of manufacture. One siege battery only fired a few shots from obsolete 8" muzzle-loading guns before being shipped to France and into 1916 at least one cadet school still only had ancient guns.²⁵ Another battery learned drill 'on a howitzer represented by two gunners standing like the fore and hind legs of a pantomime elephant. Other apparatus consisted of a blackboard borrowed from Piershill School, a No1 director from the RFA, 12 semaphore flags from the Boy Scouts, and a buzzer from the camp Adjutant'.²⁶ Territorial Force divisions had a full establishment of guns, but these were elderly pieces, and TF divisions had much to learn about horses as well as artillery tactics. It had been a constant lament that TF gunners knew gun drill, but little about actual firing; their practice camps were limited in duration, and a large portion of that time had to be spent sorting out horses, which were only rented for the few weeks involved.

To provide officers, Woolwich shortened its training course; eventually a large number of

brimstone trainer of men.

²² See Notes on Artillery in the Present War, 10/14 and Further Notes... 11/14, Helps papers, IWM. These came from GHQ, but via the WO, a step which very likely slowed dissemination.

²³ eg 'Co-operation of Aeroplanes with Artillery', 12/14, WO158/681.

²⁴ eg AT Anderson's Field Gunner's Catechism, in nine editions (London: Gale & Polden, 1916) or LES Jackson's The "Why and Wherefore" of Indirect Laying: a simple explanation for Officers, NCOs, and Men, (London: Forester Groom, 1915 and 1916), which listed another 58 publications - many official - but including The Royal Artillery and their Daring Deeds. Anderson was not pleased when in 1918 the WO prohibited unofficial handbooks although the market was drying up and he had already made several hundred pounds, at 3d royalty per copy. AT Anderson diary, RAI military document 1301.

²⁵ MES Laws, IWM sound records 490; CG Dennys IWM sound records 9876. Well into 1916 Lydd Camp had a training battery of muzzle-loaders and 9.45" howitzers left over from the Boer War, the only guns in the RA whose breeches opened to the right. Neither was ideal for teaching gun-drill. Anon., Diary of Eleventh Siege Battery RGA, now Eleventh Howitzer Battery RGA (Birmingham, nd.); Anon., 133 Siege Battery (London, nd.); LF Penstone The History of 76 Siege Battery RGA (London: S Tinsley & Co, c1938); Anon., History of 88th Siege Battery Royal Garrison Artillery, December 1 1915 to July 5 1919 (no publisher, nd.).

²⁶ Anon., 14th Heavy Battery RGA War Diary and Roll of Honour (London: Robert Scott, 1919), p4; there were modern howitzers waiting for this unit at Larkhill, and most of the men had done individual training before joining the battery, so conditions were not as ludicrous as the tongue-in-cheek history records.

Officer Cadet Schools were established.²⁷ To compensate for the overload on Woolwich, other schools were pressed into service. RFA officers went to Shoeburyness, some complaining they were being taught old-fashioned mobile warfare, not trench warfare.²⁸ RGA officers might go on very short courses to Lydd but it had to expand from an even smaller base than the RFA.²⁹ Officer training was recognised as deficient even before divisions deployed to the Western Front, and in the early spring of 1915 extra subalterns were attached to batteries in the line for a fortnight's seasoning.³⁰ Similarly a 'school training battery' was established near St Pol in an attempt to fill some officers' educational gaps.³¹ The situation persisted throughout the war, with some officers sent to France with only eight months training, including their OTC.³² However cursory an officer's initial training might be, more care was taken with those promoted to be a Battery Commander. They typically went on a course teaching administration and then another to improve their gunnery skills.³³ Interestingly, when sergeants were granted commissions they were given nearly a year's training, presumably in the more technical aspects of gunnery.³⁴ As ever, men's time and effort were wasted because the Army could not predict the future. For example, AD Somervail joined the TF in January 1915 and was taught about 5" howitzers, which were then removed from service, so he was retrained on 4.5" howitzers. The army then preferred he learn about 18prs, so he attended two courses about that equipment. He then went on a course vaguely called 'Telephone and Artillery Material' before finally going to France in May 1917, relatively well trained for his duties.³⁵ Staff officers might well be sent to schools to learn facets of their trade, like the Reconnaissance Officer who went to the Survey School, or those staff officers considered for promotion to command units who would go on standard command courses.³⁶

²⁷ J Ashley, IWM sound recording 6831. 25 existed at various times but it is unclear how many existed at any one time, the number of students or syllabi.

²⁸ HH Hemming papers, IWM. Shoeburyness had originally been intended to teach gunnery instructors, who would then train batteries, so the school had to change and expand. AJW Harvey, 'The School of Artillery', *Army Quarterly* 68:2 (July 1954), p198.

²⁹ Laws, IWM sound records 490.

³⁰ Sandys diary, 2-4/15.

³¹ TW Dove, IWM sound records 4082.

³² THW Armstrong, IWM sound records 9758

³³ KH Cousland, 'A Former Gunner of the First World War looks back', LHC.

³⁴ G Parker, IWM sound records 5047.

³⁵ I am grateful to Mr PL Somervail for this information about his grandfather.

³⁶ XIX Corps CHA diary (WO95/968) 2/17; XV Corps BGRA diary (WO95/925) 2/18, XIII Corps BGRA diary (WO95/901) 10/16.

Given the difficulties and wide variations of training, new divisions in France were often given a leavening of Regular artillery, or perhaps temporarily a Regular CRA.³⁷ This probably also helped the new divisions whose firing experience might be only a few dozen rounds on a range. As late as the beginning of 1916 New Army and TF artillery was doubled up with RHA or Regular units in the line to improve their standard of training; the high standard of drill in the RHA would have been very useful.³⁸ Similarly many depot batteries at schools were RHA units. 39th Division arrived in France in March 1916 only ten months after formation, and within a week the artillery were already attached to divisions in the line. Perhaps it was especially backward, but it served two apprenticeships in its first month, sometimes attached to divisions that only arrived three or four months earlier.³⁹ It served three months in a quiet sector and had a further ten days training behind the lines before first entering battle. However, the arrival of a mass of semi-trained artillery which had to be sent into action as soon as possible meant schools would be needed on the Western Front.

At first there was considerable diversity in schools, which were established by Divisions, Corps or Armies - sometimes all three - but eventually artillery topics were transferred from the Division-level schools.⁴⁰ The system was highly variable and records are scarce, as none of the schools had formal establishments. After the 1915 campaigning season, GHQ took the first steps to extend officer training in France.⁴¹ Memos circulated in early October, resulting in each Army establishing a school, even slightly before the War Office authorised their creation.⁴² As befitted the decentralised style of command, GHQ only explained what the schools should teach, leaving the actual syllabus to the several Armies. Each school had a battery for demonstrations and plans were to train 20 officers per course lasting 12 days. First Army started a week's course for Battery Commanders (as well as a scattering of staff officers)

³⁷ The First World War Letters of Lieutenant Colonel VM Fergusson, IWM, 12&13/5/15, 6/10/15. In at least one case the CRA of a new division went to the front before his division, to refresh his knowledge, having been wounded earlier in the year: RG Ouseley, of 59th Division. Hussey Diary, RAI, 14/12/16.

³⁸ R MacLeod papers, 1/1, LHC. For half of December 1915 5th Division's artillery was training the batteries of 38th Division Artillery one at a time. Hussey Diary, RAI.

³⁹ Wiebkin, 39th Divisional Artillery, pp10-14.

⁴⁰ Army replaced Division in early 1916; later Corps schools taught some topics. Weber, 'Mobile Artillery', p53.

⁴¹ The system of training for infantry officers was reformed at the same time. I am indebted to Dr GD Sheffield for this information.

⁴² Rawlins, History, p245, memos 8&16/10/15; Headlam Papers 183 2, RAI, 21/10/15. WO approval came on 9 11 15. Virtually all non-anecdotal information on Army schools comes from Rawlins.

late in December 1915.⁴³ First Army seem to have been the leaders in formal artillery schools, although artillery was part of the syllabus at Third Army's less focussed Officers School. When Lieutenant Colonel Tudor lectured on the lessons of Loos he discussed not only artillery matters but such details as the advisability of wide communications trenches.⁴⁴ Third Army did have an Artillery School but lacking guidance from above by February 1916 it could only think to teach FAT and open-warfare methods.⁴⁵ Second Army started a fortnight's artillery course at roughly the same time, not restricting itself to pure gunnery: tactics and man-management were also taught.⁴⁶ By the middle of the Somme fighting, the number of gunners needing training was so great that schools had to be expanded to teach 60 officers and 60 NCOs per course, and in March 1917 congestion at Home resulted in half-trained subalterns coming to France to finish training at the Army Schools. The schools ran continuously until the German offensives in the spring of 1918 when more urgent matters intervened; afterwards there was a gradual re-opening. Due to the pace of operations, some of these schools were closed and attention turned to plans for a central artillery school⁴⁷ but after the Armistice only Home establishments were considered.

There seems to have been very little liaison between Allies on training matters. British officers generally noted a higher standard of drill in French units because the French had many more regulars, even if diluted by wartime. Largely the lack of co-ordination was because of quite different weapons rather than different techniques. The French placed more reliance upon guns while the RA preferred to add howitzers. Similarly the French used the metric system and many details of their equipment, from fuze-setting machines to breech mechanisms were different from British equipment. Nor was there much contact with the Americans. American artillery was equipped with French 75s but British heavy pieces (excepting only two guns shipped from the US), and the French handled most training. The Americans did approach the BEF for lessons and experience, but these tended to be turned into journal articles for reading in the US, rather than for any direct application in France.

Schools trained individuals but there was also a need to improve the standard of whole units.

⁴³ Headlam Papers, conferences, 26/12/15.

⁴⁴ Tudor Diary 12/9 15, Fraser-Tytler, Field Guns in France, c6/1 16. Lectures would again feature in the winter of 1916-17, now supplementing schools, eg EW Alexander's lecture on CB work in December. XVII Corps CHA diary (WO95/942); Headlam, conferences, 27 11 16.

⁴⁵ Headlam, conferences, 18/2/16.

⁴⁶ R Smith Diary 1915-1917, LHC.

⁴⁷ Uniacke kept urging this, finally winning his point on 19/10/18. Rawlins, History, p254.

To do this, quite early in the war training areas were established behind the line.⁴⁸ Some times, quite reasonably, schools were located in training areas. In November 1915 there was already an 'Artillery School Havemas' but it was not until the next winter that unit training burgeoned.⁴⁹ In January 1917 'Training Area Calais' was big enough for three field batteries and an RGA group, while Second Army trained a whole field brigade and VIII Corps two field brigades.⁵⁰ It was during this winter that Divisional schools faded, replaced by Corps schools such as XIV Corps and ANZAC schools.⁵¹ This was the product of GHQ policy which encouraged a new uniformity of training and also establishing shooting ranges for practical instruction.⁵² Army schools continued their work throughout 1917, Second Army attaching enough importance to training (and perhaps the relative rest it entailed) to keep their school open during Third Ypres.⁵³ The winter of 1917-18 saw no great changes, although now some formations urged training even in the line: individual training was judged possible in the line while reserve units could train en bloc.⁵⁴ The greater number of units in reserve facilitated training even into 1918, when units earmarked as mobile reserves could use their time to train.⁵⁵

Many of the early schools were more geared to bringing officers from the different branches of service together to learn each others' problems and ideas than to formally teaching a syllabus. GHQ established a course at Aire that produced a variety of good ideas (including a version of the creeping barrage), but no such college of officers had the authority to make their findings official army policy. The Aire course's notes were marked 'These notes are not official' at the

⁴⁸ As these were not proper units no official diaries survive, only anecdotal material.

⁴⁹ XIII Corps BGRA diary (WO95/901) 11/15. At this time some divisional schools were still operating, as 6th Division who invited some of their neighbors to partake. No2 HARG diary (WO95 87) 11/15.

⁵⁰ IX Corps BGRA diary, WO95/841, ANZAC CHA diary, WO95/1034, VIII Corps BGRA diary, WO95 824.

⁵¹ XIV Corps BGRA diary (WO95/915) 12/16. The courses ran two or three weeks.

⁵² It has not been possible to trace General Staff Circular 29 from the one reference found. The circular was detailed enough to prompt ANZAC to establish a 'Programme of Training for Heavy Artillery, Divisional Artillery Brigades, Sections of Divisional Artillery Columns, and Trench Mortar Batteries out of the Line.' ANZAC BGRA diary (WO95/993) 12/16.

⁵³ IX Corps BGRA diary (WO95 841) 7 17.

⁵⁴ ANZAC BGRA diary (WO95/994) 11 17.

⁵⁵ XIII Corps BGRA diary (WO95 902) 6/18. Although never stated, this seems to have been a deliberate policy.

same time as the BEF relied on GHQ's uninspiring 'Tactical Notes' series.⁵⁶ Any ideas produced had to go through the General Staff and compete with a burgeoning in-tray until an Inspector-General of Training was appointed in mid-1918 (Sir Ivor Maxse) who interpreted his brief to include deciding what should be taught as well as how to teach it. Lacking a single control point for doctrine, GHQ had to consult the Armies about artillery ideas. While this doubtless brought forward many new ideas, when there was disagreement it tended to produce lowest-common-denominator results.⁵⁷ By late 1916 schools had become an accepted part of the BEF, and in the next years training syllabi would be officially printed for use across the BEF. The first was 'Instructions for the Training of British Armies in France', followed by the 'Catechism for Heavy and Siege Artillery Subalterns', later broadened into a 'Catechism for Artillery Officers'.⁵⁸ It is not the purpose here to go into great detail of the course of instruction at the various schools, and regardless of intention they varied. Despite the optimism of one instructor that he was teaching his pupils 'the latest ideas in gunnery and [giving] them some training in mobile warfare', some pupils simply saw schools as a break from the front and a chance to 'give us a change'.⁵⁹ Furthermore despite the industry of officers who could take 112 pages of notes during a ten-day course, it was possible for superiors to grouse 'what proportion of Battery Commanders have ever seen a text book of Gunnery?'⁶⁰

Yet at the highest levels there was criticism about splitting the artillery, separating technical and tactical training. Officers should have been learning how best to use their guns to support the combat arms but instead were learning abstruse topics only suited to artillerymen. Arthur Holland, no stick in the mud himself, wrote Birch '... The Siege Schools are also run on the wrong lines. They do not seem to be able to realise that Siege Batteries (the name is misleading) are a portion of the Field Army and must be prepared to act and think quickly without any loss of accuracy. ...'.⁶¹ As the war drew to a close and there was the opportunity to look to the future, Birch himself contemplated how things might be reshaped. He knew the

⁵⁶ WO33/756, of which only 200 copies were printed further limiting dissemination. 'Tactical Notes' also apparently went into remission later in 1915; the last edition seen (WO33/721) is 8/15.

⁵⁷ Headlam, conferences, 2, 24 & 31 12 15, 10 3 16. Later Divisions and Corps could write direct to GHQ, expanding the base of experience to draw from and presumably hastening the spread of new methods. Also, suggested changes had to be sent in 'privately' rather than admitting that senior officers had no monopoly of wisdom, which must have stifled discussion.

⁵⁸ SS152 (6/17 and 1/18); SS592 (10/17 and 3 18). The RGA preserved their separate training pamphlet, SS614 'Training Instructions for Siege Artillery' (3 & 7 18).

⁵⁹ SCM Archibald papers, IWM, p132; J Ashley, IWM Sound Records 6831.

⁶⁰ EG Angus papers, IWM; SR Wason, 'Sums in the Field', *JRA*, 45:6, p189.

⁶¹ Holland to Birch, 29/12/16, Anstey Papers, RAI.

strengths of both garrison and field artillery and wanted to combine the strengths; as a horse artilleryman himself he may be permitted to think the garrison artillery had to do more:

... One of the great drawbacks in this war has been the want of any tactical knowledge or training on the part of officers of the Garrison Artillery, and as long as they remain a separate branch this want of knowledge and experience is bound to happen again. Furthermore, the very life of a Garrison Artillery officer in peace tends to mental and bodily deterioration.⁶²

That same lament could have been applied to the pre-War army as well, and it is remarkable how thoroughly technical the BEF became. Before the War an officer was laughed at for suggesting a battery carry a thermometer and barometer in the field; telescopes were not standard equipment and considered somewhat underhanded.⁶³ In 1915 slide-rules were issued along with anemometers and telescopes, the last to all batteries and brigades.⁶⁴ The impressive feature of artillery training was that a Regiment so ambivalent about technical gunnery should not only transform itself, but do this while absorbing enormous numbers of men who knew nothing whatsoever about ballistics or gunnery.

Furthermore it was not just a question of teaching to the level of 1914 because the state of the art was constantly improving. In 1915 the RFC offered meteorological data to the RA but the MGRA at GHQ had to decline, saying 'we cannot make any use of this information'.⁶⁵ This was not a matter of General du Cane sticking his head in the sand - in 1915 it could not be used, but in 1916 such information percolated into the artillery and by 1917 it permeated everything gunners did. 1915 did see some technical instruction: the RA was having to deal with new ammunition, which frequently required laying with a false range, and there were attempts at calibration.⁶⁶ In 1916 the 'Artillery Notes' series amplified and superseded much that had gone before; there also had to be a section gently explaining to the infantry why some shells might fall short.⁶⁷ 1917 built carefully upon the experience of 1916, including one

⁶² Birch to Horne, 21/10/18, Anstey Papers, RAI. Birch was adamant about supporting the combat arms, but flexible about how to do it, witness his developing the 'Birch Gun' and his post-war support for tanks. I am grateful to Mr PGW Annis of the RAI for these points.

⁶³ Bingham, '1913 Practice Camps', p495. The officer laughed at was H Rowan-Robinson RGA, who was *psc* and an instructor at Woolwich; those laughing were presumably mostly RFA.

⁶⁴ Director of Ordnance Services, (WO95 58), 2&28/5 15; 28/6/15; 9 8/15.

⁶⁵ quoted in Farndale, Western Front, p372. This has sometimes been held up for ridicule, but at the time it was only stating the truth. Technical proficiency of a level to handle meteoric corrections had not yet arrived. Tim Travers, The Killing Ground: The British Army the Western Front & the Emergence of Modern Warfare, 1900-1918, (London: Routledge, 1987), p162, is very harsh and I believe overly so.

⁶⁶ eg CDS49 (9/15) '18pr Correction Scale' for use with the new marks of ammunition.

⁶⁷ CDS98/1 (1 16) 'Close Shooting in the Field' superseded CDS30-32 which it has not been possible to trace. CDS98/2 (1/16) 'Field Artillery Ammunition' brought all the related pamphlets from 1915 together.

pamphlet aimed straight at all the officers who had been confused by their first 'Meteor' telegram: SS149.⁶⁸ This opened soothingly, 'The following Notes are intended to meet difficulties which Artillery Officers have felt and experienced in connection with Meteorological Reports issued to them' and went on to gently explain what needed to be done. Throughout 1917 and 1918 training became increasingly technical, although never neglecting other duties such as horse- and man- management. By 1918 it was not just officers who were making ballistics corrections. Officers would calculate the base range, then the No.1 on each gun - a sergeant - would adjust for wind, barometric pressure and temperature.⁶⁹ Similarly, details of gunnery permeated the Royal Artillery to the extent there was even a standard army form to record lifts and switches for each gun: Army Form W3981, 'Barrage Table for No_ Gun'.⁷⁰

By 1918 the range of courses had burgeoned to include exotic subjects like using captured German guns.⁷¹ This was in addition to the usual range of technical training and scientific gunnery, subjects which so dominated syllabi that complaints arose that officers were better technicians than tacticians.⁷² After the appointment of the Inspector-General of Training, artillery training became still more systematised although it would be difficult to say it improved markedly. The standard was already quite good and the time available was too limited, but between the wars several suggestions were adopted which did result in improved training. Artillery training was the province of Herbert Uniacke, an efficient organiser and Deputy IGT. He did not greatly change programmes of training, but having an IGT made for quicker reactions to the changing circumstances of war. Thus a school instructor could write

We were concentrating chiefly on open warfare tactics and tried to make young officers realize that FAT, the gunner's Bible, was still as correct and up-to-date as the day on which it was written. No easy matter trying to dispel the clinging miasma of siege warfare conditions. General Uniacke spent much of his time at the school, and under his guidance you may be sure that the instruction was thorough and up-to-date. [Uniacke] has long been desirous of starting one great central school for Colonels and Battery Commanders in which every Artillery subject is taught, and also a Northern and Southern School for junior officers. By doing away with Army Schools, uniformity of instruction would at last be secured, and that is greatly needed. Only too often instructors will not stick to THE BOOK, but teach fancy systems of their own - very fancy they often are, and confusing to young

⁶⁸ SS149 (3 17) 'Notes on Meteorological Telegrams to the Artillery'.

⁶⁹ NAM document 6410-42, F(?) C Hocking. Hocking's life was saved because he made these calculations in a muddy hole instead of at his gun.

⁷⁰ copies in J Batten Papers, RAI Military Document 1348.

⁷¹ Headlam papers, f58, Nicholson, Canadian Gunners, p342. Practical advice included filling buffers with soapy water if the Germans had drained the oil.

⁷² eg the lament of Third Army's MGRA in 6/18, letter RA/3259, WO95/374.

officers going from one school to another.⁷³

In 1918 a larger part of the BEF than hitherto was in training; Uniacke made sure the latest artillery ideas were circulated rapidly, not even waiting to produce a full SS pamphlet but reviving 'Notes on Recent Fighting'.⁷⁴ While these had been inadequate in 1914 and 1915 - it would have been better teaching teach raw gunners gunnery rather than tactics - by 1918 the army had enough experience to add new levels of sophistication. Frequently IGT was urging the use of FSR or FAT to deal with the mobile fighting; the repetition of this theme suggests the lesson was not always getting through.⁷⁵ By September Uniacke was so vexed that he proposed a school solely to teach open warfare to battery and brigade commanders alike.⁷⁶ Armies urged mobility but it could sound extraordinarily old-fashioned, as when Third Army encouraged 'the inculcation of the old Regimental system'.⁷⁷ IGT and GHQ spent considerable time and effort probing the experiences of the fighting units, something that to the recipients must have looked mightily like badgering.⁷⁸

Another strand of training in 1918 was the stream of technical information sent to all units. As with the 'Notes on Recent Fighting', the BEF was now sufficiently experienced to absorb these details within the division - there was no need for entire units to go to a school, the gradual turnover of personnel was sufficient. Reinforcing this picture of a thoroughly-trained artillery, when 52nd Division was transferred from Palestine to the military complexity of the Western Front the whole division was put through nine weeks of training, more than the divisions reduced to cadre when re-built.⁷⁹

Thus in 1918 the schools were less important, largely because they had already done their work. In previous years schools had been closed during the campaigning season, but in 1918 they stayed open, but just as much instruction was done by the batteries themselves while in reserve, straight from GHQ and IGT pamphlets. IGT built on a solid foundation, and encouraged, standardised and fine-tuned.

⁷³ Fraser-Tytler, Field Guns in France, 24/4/18. Uniacke delayed Fourth Army stealing Fifth Army's school when the army was disbanded, but lost it during a brief trip home. Uniacke Diary 1918, RAI.

⁷⁴ There were eventually nineteen Notes, not all concerned with artillery.

⁷⁵ see Uniacke papers, U/I and U/II, RAI.

⁷⁶ Uniacke papers, U/I 8.

⁷⁷ Third Army letter RA/3259, 17 6/18, WO95/374. It would have been a challenge for the many officers who had never experienced the 'old Regimental system' to inculcate it.

⁷⁸ Uniacke papers, RAI, U/III. Some of these reports were collected before the IGT was established, presumably by GHQ.

⁷⁹ EA James Papers, IWM. I am obliged to Mr A Simpson for this material.

The most important single school was not even part of the BEF, but located at Larkhill in Wiltshire.⁸⁰ At the beginning of the war there was not even a school but simply practice ranges, established in 1899. It kept this purpose, and many New Army gunners would fire their first rounds at Larkhill just before embarking for France. Over the winter of 1914-15 various Dominion units quartered on Salisbury Plain did their training at Larkhill, which led to the first buildings being erected, and may also have contributed to the unusual name of the 'Overseas Artillery School'. The first step in creating something more substantial was an Army Council order in February 1915 which foresaw the eventual move of the School of Gunnery from Shoeburyness to Larkhill, but in the interim a new school would be established at Larkhill and Shoeburyness maintained.⁸¹ The staff was quite small, only seven men, but the course was more demonstrations than hands-on practice for the students; because it was only a demonstration course the staff never expanded.⁸²

Two courses were run, one for men to be promoted Battery Commander, the other for prospective Brigade commanders. The courses were only a week at Larkhill, as one week's lecture work was done at Shoeburyness with the prospective Battery Commanders then completing the second half of the course at Larkhill while Lieutenant Colonels spent all their time at Larkhill.⁸³

Larkhill's staff was high calibre, a feature that would remain true throughout the war. The first Chief Instructor was Walter Ellershaw, transferred from Netheravon where he was commanding a school for air-artillery co-operation; he had commanded a battery early in the war, and would rise to command the heavy artillery of three different Corps.⁸⁴ The first director of experiments (a post officially established only in 1918) had been CRA of two divisions and would return to a third; the camp's first commandant would move on to be CRA of two divisions.⁸⁵ Perhaps the strongest indication of the importance attached to Larkhill was

⁸⁰ Larkhill's history is well covered in NDG James, Gunners at Larkhill: A History of the Royal School of Artillery (Henley-on-Thames: Gresham Books, 1983) (henceforth James, Larkhill) but I must also thank Lieutenant Colonel (retd) 'John' Payne lately of what is now the Royal School of Artillery, Larkhill.

⁸¹ Army Council Instruction 20 (12/2/15). The school already migrated from Shoeburyness to Larkhill for the summer practice season: King's Regulations ¶767.

⁸² James, Larkhill, pp47, 51.

⁸³ EG Angus papers, IWM; James, Larkhill, pp47-8.

⁸⁴ Ellershaw was with I Corps 2/17-2/18, VIII Corps 2-6/18 and VI Corps 6/18 to the Armistice. Larkhill had an attached RFC flight for the rest of the war, perhaps from Ellershaw's connections.

⁸⁵ The men are WB Browell and WG Thompson. There is considerable confusion in the early command structure and establishing a full chronology of commanders; the name of the school is also rendered with almost every possible variation, often by the same source.

the commandant during the second winter of its existence.⁸⁶ BR Kirwan had been an RA staff officer at GHQ, a CRA during the Somme fighting and immediately after his winter at Larkhill he returned to France to command XV Corps artillery until the end of the war, earning Haig's approbation.⁸⁷ Larkhill was important enough that Kirwan was relieved a month before the school took in its first pupils; he had to assemble instructors and revise the syllabus.⁸⁸ He took his duties seriously and mid-way through his posting at Larkhill toured the Western Front with his Chief Instructor, explaining his work and asking for advice; perhaps because of this profile-raising various CRAs, CHAs and BGRAs turned up to watch for a few days.⁸⁹

Kirwan made Larkhill a 'centre of excellence', testing various methods of ranging, wire-cutting and creeping barrages, although some observers drily noted that school results were better than those experienced under field conditions.⁹⁰ Conversely, Kirwan complained that circulars and pamphlets did not get the attention they warranted from junior officers. The technical work Kirwan did at Larkhill was the basis for GHQ's first series of Artillery Circulars, and after his promotion to XV Corps Kirwan kept at his technical work, circulating calibration statistics worked out from practical experience.⁹¹ The importance of Larkhill to technical gunnery is apparent through the cycle of the 'Artillery Circulars'. These appeared during Larkhill's second season, disappeared during the summer of 1917 and returned when the school resumed; the series then lapsed again until the IGT revived it. Larkhill seems to have gone into suspended animation during the campaigning seasons of 1916 and 1917, but again during the winter of 1917-18 it returned to life with field trials, especially in wire-

⁸⁶ Much of this section is drawn from SS157 (5/17), 'Report on the Overseas Artillery School, Salisbury Plain, November 1916- March 1917'.

⁸⁷ Haig Diary, 11/6/17. Kirwan had been an instructor at the School of Horse and Field Artillery before the war.

⁸⁸ Kirwan reported he had to devise a syllabus, which suggests the previous winter's courses had been unimaginative and old-fashioned; Kirwan presumably also had to co-ordinate the split course with Lydd.

⁸⁹ Sandys Diary, RAI, 21 1/17, 18-23 2/17. Sandys himself went to Larkhill upon being promoted to BGRA in February 1917.

⁹⁰ Headlam papers, conferences, 28/12/16 and ff67-76, 177; Bland papers, RAI, letter, CW Scott to Bland, 3 4/17. Test barrages would become 'ragged' after only twenty minutes, which suggests in the field the infantry were right in their frequent complaints about short rounds. However, Larkhill tests provided so much information that range tables were revised and reprinted so gunners could again have confidence in them.

⁹¹ Headlam papers, f170 'Calibration: Statistics prepared by R.A. XV Corps to determine Muzzle Velocity from wear measurements'; RH Chapman, A Treatise by Major RH Chapman on the calibration of guns and howitzers by the direct measurement of muzzle velocity, as carried out at Shoots of Artillery in France and England (Chapperton Down) 1917 and 1918; RAI Military Document 2021.

cutting.⁹²

After Kirwan's season, Larkhill declined in importance, but largely because he had done so much valuable work.⁹³ The next commandant, SF Metcalfe,⁹⁴ drummed up less publicity for the school (and himself) but very probably the number of students did not fall from the 1900 recorded over the winter 1916-17.⁹⁵ GHQ urged maximising the number of officers taught at Larkhill, but then the Passchendaele battles kept many officers in Flanders over a month longer than expected.⁹⁶ The WO now believed in the good work Larkhill was doing and wanted to keep it open throughout the campaigning season of 1918, even with fewer students, but the pace of the fighting made this impossible. In light of the decision finally to create a central artillery school, Larkhill was revived after the Armistice for the same courses, but only for officers intending to stay in the army.⁹⁷

Larkhill was also important in the early development of Sound Ranging, although the key breakthrough was made by independent innovators in France.⁹⁸ Once the method had been perfected, its operating parameters were established by experiments at Larkhill and circulated through the BEF; Kirwan seems to have been the first to spot the possibility of using SR equipment to calibrate guns, a critical innovation.⁹⁹ Other technical developments were tested at Larkhill, perhaps the most notable being smoke shells, the first batches being fired at Larkhill in the summer of 1916 and the school's commander effectively given responsibility to

⁹² Headlam papers, ff100, 104. One topic Kirwan had wanted to address was the performance of munitions, ie blast patterns, relative lethality etc. In his report on Larkhill he mentioned the subject, but no such pamphlet has been seen or is listed in contemporary catalogues, although the MGRA at GHQ had a file on the subject: Headlam papers, RAI, f67.

⁹³ Another indication of Kirwan's dynamism is that he apparently provoked the school at Shoeburyness to produce its own pamphlet 'Notes on Trench Warfare for Field Artillery compiled at the School of Instruction RH & RFA'. After Kirwan's return to France Shoeburyness apparently returned to their slumbers.

⁹⁴ Metcalfe had been BGRA of XVII Corps until 9/17, was then relieved to see to Larkhill, returning as BGRA XI Corps in 4/18; this pattern was similar to Kirwan's.

⁹⁵ 85 were prospective brigade commanders, 1815 battery commanders: SS157. The school had been intended to teach a total of 1200 officers per season; 1900 was 58% over expectations. Rawlins, History, p249.

⁹⁶ Ibid., pp251-2.

⁹⁷ Ibid., pp254-5.

⁹⁸ Geographical Section, General Staff Report on Survey on the Western Front, 1914-1918 (London: HMSO, 1920), p108 (henceforth Geographical Section, Survey Report); JR Innes Flash Spotters and Sound Rangers (London: Allen & Unwin, 1935), p150; Sir Lawrence Bragg, AH Dowson, and HH Hemming, Artillery Survey in the First World War (London: Field Survey Association, 1971), p38. Bragg *et al* seem unaware of work done at Larkhill, work which, however, was fruitless.

⁹⁹ SS552 'Sound Ranging' 3 17; Geographical Section, Survey Report, p177.

decide what the army would use.¹⁰⁰ Experimentation was a fairly common activity at some of the permanent installations in Britain. Early in the war some field tests were done in France, largely of munitions which were performing badly. When the new Amatol filling was tried, many 'blinds' were reported, which led to trials outside Calais, confirming the problem, which was then relayed back to the MGO.¹⁰¹ Anything done in France or even at a school was outside the 'usual channels' of the Ordnance Committee, but the MGO (Stanley von Donop) realised the urgency of the situation. Complaints from the field were forwarded by GHQ and over 8,000 shells were fired at Shoeburyness to determine the causes of the prematures, no small number during the shell shortage.¹⁰² The problems were found to be with the fuzes and gaines¹⁰³ and the results were reported to GHQ as well as the War Office. Another area where schools were used to integrate existing technologies was with aeroplanes. Almost immediately gunners realised aeroplanes could provide observation and correction for artillery fire, but co-ordination was sketchy. Many called for the use of wireless telegraphy,¹⁰⁴ but the earliest tests were with simpler methods, such as light signals, and took place on Salisbury Plain in early November 1914.¹⁰⁵ The rapid pace of developments in aeroplanes, wireless equipment and artillery technique meant that most experimentation took place at the front, but results and methods were frequently circulated to the artillery and the army as a whole. Indeed, over twenty specific pamphlets and notes were issued by the General Staff regarding aerial co-operation in addition to mentions in more general publications.¹⁰⁶

Had there been an intention to change the fundamental principles of the British army, then it would have involved training and schools. Furthermore, had it been the hidden agenda of the artillery to change their place in the army they would have had to do so via re-training men and units. They did not do so, although substantially changing training methods and content. It was under Haig's command that GHQ recast training, and therefore responsibility was his.

¹⁰⁰ Anstey galley proofs, p194.

¹⁰¹ von Donop Papers, IWM. Unfortunately he gives no dates for this, but it was clearly in the early days of Amatol, probably between April and June 1915.

¹⁰² *Ibid.* The tests were probably done in August and September 1915.

¹⁰³ Gaines are 'boosters' that amplify the fuse's explosion, needed for more stable types of HE.

¹⁰⁴ In 1914 Henry Horne was already calling for 'wireless aeroplanes'. Horne Papers, IWM, 'Notes on artillery during the attacks of 13th and 14th [September, 1914] and subsequent operations on the Aisne,' p2.

¹⁰⁵ Tests on the 3 11/14, with one aeroplane working with each battery. 'Further Notes on Artillery in the Present War, November 1914', Helps Papers, IWM. It may have been this system of which GHQ had 10,000 copies printed; it was already described as the 'old' system. WO158/681.

¹⁰⁶ By the end of the war virtually all artillery publications discussed working with aeroplanes.

Before the war Haig had overseen the writing of FSR, which was meant to be the final layer of army doctrine, drawing together the various component arms and branches into a coherent whole greater than the sum of its parts. During the conference that decided on their acceptance, one member of the Army Council made great fun of the proposals, enraging Haig who sensibly retorted that a system was needed and if the proposals proved inadequate they could be improved upon.¹⁰⁷ In bringing in a system, however imperfect, Haig was living up to his training as a staff officer. During the war the system languished mainly because Sir John French was not a trained staff officer and did not create the necessary mechanisms to benefit from experience.

The New Armies and Territorial Force training in Britain were most in need of guidance, and what they were provided was fragmentary. The idealistic flower of British manhood had an immense fund of respect for the Regular Army, willingly accepting the chaotic conditions of training, lack of equipment and assorted discomforts of military life in order to do their bit. They avidly followed any news of the war and threw themselves into following whatever orders the - often decrepit - instructors gave. However, this was a nation in arms and it was better educated and more intelligent than previous British armies. While generally accepting their training was appropriate, they yearned to be taught the most up-to-date thing: trench warfare. It did not really come into their minds that the Regular Army had no ideas about trench warfare. This led to a flowering of unofficial material on the 'new' warfare. For units with few or no regular officers, FSR were unintelligible, and specific arms training manuals difficult enough.

The unofficial manuals only sprang up because the army was not providing anything. Trench warfare was as exotic as any adaptation of the 'normal' rules required by imperial campaigning. Some officers grappled with the very concept 'trench warfare', wondering if it were perhaps really a siege writ large (and therefore soluble through siege techniques), perhaps not so different from normal warfare that a bit of perseverance and adaptation would see through, or a perhaps new form of warfare that would require entirely new methods. Combined with the immense organisational changes required by an ever-increasing Army, the BEF lacked disciplined thinking at its head. It muddled through 1915 without reaching a conscious decision.

With higher headquarters at sea over how the war should be fought, Regular units also suffered from the lack of central direction. Trench warfare became an excuse for every unit doing things differently. What advice percolated back to GHQ, through the War Office and to units training in England was about the minutiae of trench warfare: reliefs, sentries, bombing

¹⁰⁷ Reminiscence of General H de Pree, quoted in John Terrane Douglas Haig: The Educated Soldier (London: Hutchinson, 1963), pp42-3.

parties and sapping.

Upon Haig's promotion to command the whole BEF he began remedying the situation. Army Printing Services began printing thousands upon thousands of copies of pamphlets covering not just the details of military organisation, but looking beyond to the army's purpose: fighting. Compared with the sophisticated planning guides and tactical instructions that came later, the first generation of pamphlets were distinctly amateur. Some officers sneered at this first generation afterwards, but probably did not stop and think how much they improved the status quo. The bulk of divisions in the BEF before the Somme offensive had not made a major attack and green divisions arrived on the Western Front into 1917. If this force were to be brought to any level of inter-operability there had to be a starting point beyond Infantry Training. As Haig had said, it was better to have a system that could be improved upon than no system at all.

Until mid-1918, when IGT took control, these pamphlets were the product of the General Staff. The various arms were in charge of their own detailed training, but each was taught what they needed to know to fit into a greater whole. Artillery learned how to improve, for instance, their accuracy, but at the same time were told how best to use that accuracy to aid the combat troops.

The multitude of CDS and SS pamphlets should be seen in this light. The great bulk of these were, either specifically or broadly, for teaching purposes; the rest were mainly intelligence material. At the beginning of the war there was little differentiation among the pamphlets, rather tactical details were written down and as soon as a page or two was ready it would be printed. Later as new weapons were introduced pamphlets were written first explaining the new technology, then after the initial use tactical suggestions were made and eventually the tactics were refined.¹⁰⁸ The first items published were clearly intended for home consumption: the title was 'Notes from the Front' and at the time the British front was small enough that the whole BEF was experiencing the same conditions and did not need to be kept abreast of events in other sectors of the line.¹⁰⁹ However, units at home needed to learn the differences between war as expected in FSR and the reality.

As the war settled down and the BEF expanded, not just in numbers but in frontage as well, there were new pressures. First, the BEF was no longer homogenous. Territorial

¹⁰⁸ eg with gas: SS134 (12/16, 3 18) 'Instructions for the use of Lethal and Lachrymatory Shell'. There were revisions immediately the Germans introduced mustard gas: see pencilled draft at the IWM. In 1917 SS139 4 'Artillery in Offensive Operations' included details on gas far more advanced than 1916's CDS98/4.

¹⁰⁹ CDS2-4 & 53; CDS2 was GHQ reprinting III Corps' 'Tactical Notes' of 9-10 1914.

divisions, the Indian Corps, Dominion units and eventually the Kitchener Armies all had different levels of training and equipment and all had to be fitted into the BEF. Second, the state of the art was constantly changing, not only as armies grappled with the surprises of trench warfare but also as trench warfare itself evolved. Third, as the British front lengthened the differences along the front increased. Different tactics evolved in different areas, but since only part of the BEF would be engaged at any one time there was also a need to spread lessons within the BEF. There was a quest for ideas from the French, but these were generally more rarified concepts, as the BEF trusted to its own tactical lessons.¹¹⁰ Gradually there were specialist pamphlets for most of the BEF, the cores of which would be extracted for further pamphlets advising the staff how best to plan operations.¹¹¹

As the BEF learned the business of trench warfare the nature of SS pamphlets changed. Not until 1916 did a comprehensive set explain the most advanced British ideas throughout the BEF, and many units treated these as advice rather than instructions. In 1917 and 1918 there was far more assertiveness from above, because after the Somme offensive it was realised that the whole BEF had to be 'on the same page' for operations.

Artillery training followed a course parallel to developments within the whole army. The first priority was trained men, and every effort was bent to meeting it. This led to remedial work once partially-trained units arrived at the front. Gradually the quality of training improved, paralleling the increasing technological sophistication of the gunner's trade. Schools served both to train individuals and to push the bounds of technology. This role was not intended for them, but brighter lights saw what was happening and enthusiastically encouraged it. Once the men were trained - not really until the end of 1917 - it was time to train whole units. Unit training stressed mobile operations, seemingly a backward step. Yet the gunners already knew trench warfare methods and mobility was their weakness. By the end of the war this was improving and the infrastructure that had built a large, well-trained force was retained. Through all the war training emphasised the artillery playing a supporting role relative to the combat arms. Gunners first made sure of their ability to do their job well, a job which changed form but not purpose as the war continued, but they never forgot their supporting role.

¹¹⁰ CDS24 'Object and Conditions of Combined Offensive Action' while at roughly the same time GHQ was publishing CDS50 'Tactical Notes' explaining how the British army should fight.

¹¹¹ In 1916 artillery pamphlets were essentially free-standing, but in 1917 the first words of SS139 4 were that it should be studied together with infantry instructions and many sections were direct quotes from SS135, 'Instructions for the Training of Divisions for Offensive Action'.

Command and Staff Arrangements

Military units are impelled by the orders of their commanders, transmitted through the staff. Troops are sent where they are most needed or where they can do the most necessary work. In peacetime the command system reflects the expectations of what the next war will be like; a command system also reflects how an army thinks about its components. Wartime changes are nearly inevitable as some assumptions prove false. These changes are reactive, happening only after something has gone wrong. In the Great War armies found themselves facing unprecedented tactical, strategic and logistical problems. On top of these there was a flowering of technology which had to be harnessed to solve problems, rather than create new ones. Commanders had to grapple with everything from laundries to poison gas, and new arrangements were inevitable. Artillery command and staff systems were just a part of the expansion, paralleling the general trend. Despite the scale of the changes, there was not a different relationship between the artillery and the other arms. The organisation reflected the artillery's place in the army, and the changes in its importance. Gunners fought for alterations in their command structure, but to allow them to do their job better rather than greater 'political' influence in the army. The first years of the war saw the worst problems but the new command structure was complete by the winter of 1916-17. This allowed the artillerymen - and the rest of the army - to become familiar with it, and time could be spent on tactical and technical innovations. Changes took place at all levels, and this chapter will follow them from the bottom upwards.

The Battery

The smallest artillery unit was the battery, at most six guns, roughly two hundred men and a similar number of horses. Heavier guns were organised in smaller batteries, down to only two for super-heavy rail guns. Batteries had no staff of their own, and only a maximum of five officers: a major as Battery Commander; a captain in charge of administration and the horse lines; and three lieutenants each in charge of two guns (a section), their detachments and horses. During the war batteries suffered far fewer changes than corresponding infantry units, with most changes being restricted to the number of horses and drivers. Various types of siege battery were created from scratch, and establishments were juggled, with varying numbers of Army Service Corps or Army Ordnance Department men attached, but these changes were on the margins. In comparison, infantry battalions had men transferred or earmarked for virtually every speciality under the sun, and by the end of the war the establishment of an infantry battalion had declined by nearly ten percent. Even the internal structure of the battalion had

seen serious upheaval, with platoons becoming a more important tactical formation than companies, while sections never threatened batteries.

The Brigade

Artillery brigade HQs also saw little change to their own composition, but as with infantry brigades their components changed markedly.¹ The artillery brigade had been anticipated as the main combat unit, and its staff was therefore reasonably large; that there was little increase in establishment emphasises that the 1914 levels were generous. Over the course of the war artillery command and control were centralised at higher level, but brigades still had plenty to do, mainly the never-ending struggle to maintain communications with subordinates. The components of a brigade changed during the war, in both RFA and RGA.

In 1914 RFA brigades had three batteries, all either 18prs or 4.5" howitzers. In 1915 and 1916 there were schemes to standardise the number of guns in a battery and batteries in a brigade (for there were numerous variations between divisions) but nothing happened until the winter of 1916-17. RFA brigades were then reorganised to comprise three batteries of 18prs and a fourth of 4.5" howitzers. The difficulty of commanding two different natures of artillery was balanced by the reduction in numbers of brigades, allowing more experienced commanders. The new brigade neatly matched the tactics of the creeping barrage, for one 18pr battery would be superimposed over the other two pending targets of opportunity, while the 4.5" howitzers would spread their fire ahead of the rest. This pattern proved itself, and survived the war.

There were two kinds of RGA brigade in 1914, but both were merely paper organisations. Siege Brigades were to be formed, composed of the heaviest available howitzers. However, they were mobilised as batteries, then sent to France and employed individually. It has not been possible to trace what happened to the jilted peacetime Brigade Commander, CO Smeaton, but he held no senior posts during the war and was even allowed to retire in 1917. The other theoretical brigading of heavy guns were the Heavy Brigades. These were merely peacetime administrative groups before the Heavy Batteries were parcelled out to divisions upon mobilisation.

The Siege Brigades failed largely because they did not fit the command structure. RGA Brigades had never taken part in manoeuvres and few officers knew their potential; they were also organised for quasi-independent operation but the only artillery officers legally entitled to

¹ The brigade staff increased by one when signals were transferred from RE to RA. Weber, 'Mobile Artillery', p55.

command them were Divisional CRA.² A whole brigade was more than a division warranted, yet Corps could not take command. With all divisions clamouring for artillery support, it is not surprising the available guns were thinly spread.

Heavy artillery grouping passed through several phases during the War. After the 1914 campaign ended, brigades were organised for heavy artillery. However, these had no fixed form: any number of batteries and different gun types might be brigaded together. Nor were the brigades functionally differentiated, for a brigade would be responsible for both bombardment and counter-battery work. This worked badly and was quickly modified, with most howitzers being parcelled out to Divisions while a new command echelon was created on top of the Brigades RGA.³ This new headquarters was the Heavy Artillery Reserve Group, and it controlled heavy guns and the heaviest howitzers.⁴ Orders were issued through the Brigades, which became functionally different: howitzers or guns, bombardment or CB. As a system it was a stop-gap and it was unclear to whom the Commander of the HARG was to report. The artillery chain-of-command was still undeveloped, so it was typically an already-busy Corps or Division GOC, who often failed to make the best use of artillery.

The next experiment, effective early in 1916, was Groups, commanded (as brigades were) by Lieutenant Colonels. These were nothing more than re-named Brigades, although they were functionally organised and they had something of a staff. There were still the problems of administration and discipline as batteries were shuffled around into different brigades, but the system did improve matters. Largely the improvement was due to the new system at Corps level, and simply greater experience of all concerned. There was a slight refinement in 1917 when two would be put into a 'double group' with one commander handling operations and the other administration. This was restricted to the most active sectors of the front because elsewhere guns were not so concentrated.

Over the winter of 1917-18 there was a final reorganisation of the RGA back into Brigades,

² Legally, Corps-level Artillery Advisers were not commanders.

³ Beyond tactical problems, the hodge-podge brigades bred complaints about discipline, training and administration. While doubtless true, one can have some sympathy with a brigade commander operating without a trained staff, trying to cope while everything changed, including his subordinates.

⁴ Seven of the ten HARG commanders later rose to higher levels of command; the other three continued at the same level after a re-organisation in March 1916. Talented men had been identified for these commands early in the war, but conditions were not ripe for them to have much effect yet.

since GHQ recognised the RGA had been overly fatigued during Passchendaele.⁵ However this time the Brigades had firm format, there being four kinds of Brigade: Mobile, 8" Howitzer, 9.2" Howitzer and Mixed.⁶ This greatly simplified artillery handling for higher headquarters because they knew immediately the composition of a brigade from its title. Brigade Commanders' authority increased and both administrative and disciplinary matters improved because batteries no longer floated between brigades or groups so the chain of command had been tightened. The RGA ended the war with this structure and the system was maintained afterwards.

The Division

At Division level, most changes happened early in the war. At first the CRA of a division was the only artillery officer legally able to command anything and therefore all artillery was parcelled out to divisions. By early 1915 this had changed but a CRA would still command a plethora of batteries. Some were brigaded but some not and those would have to be commanded direct from RAHQ, which had not been given any extra staff officers. There was also difficulties of different tactics and supplies with various natures of guns and ammunition. There were apparently no complaints from CsRA when slightly later in 1915 the heavy guns were taken away.⁷ Further reorganisations touched little upon the Division except that in early 1917 one-third of the divisional artillery was taken away. This did not cause noticeable complaints and CsRA got on with their job.

While no longer commanding heavy artillery, CsRA still handled it during bombardments. In preparing bombardments, categories of targets and priorities would be laid down at high level—often Army, influenced by GHQ. Divisions in the line, however, would be responsible for naming which targets in their sector were bombarded and to what extent. This would be settled by the GOC, CRA and the infantry brigade commanders, so the CRA was very much a team player. They would also be responsible for all wire-cutting, whether by trench mortar, field artillery or medium howitzer. This was another powerful reason for a Division to have several days in the line before an attack. Corps would monitor the plans of divisions, arrange for

⁵ Rawlins, *History*, pp156-9. After the war Birch wrote 'as soon as it became feasible the brigade system was introduced and the artillery brigade became the highest permanent group in the heavy artillery'. Sir Noel Birch, 'Artillery Development in the Great War', *Army Quarterly*, 1:1 (1920) pp.79 89. (hereafter, Birch, 'Artillery Development')

⁶ This is a slight exaggeration: four other Brigades remained. These handled railway guns, operating from Army HQs; they eased rather than hampered standardisation. see Farndale, *Western Front*, p357.

⁷ As with almost everything this must be lightly qualified, for it was common for a division in a quiet sector to have some 60prs and/or 6" howitzers available, but give up a battery of 4.5" howitzers. The division gained guns for harassing fire or minor destructive work, while Corps could use the 4.5s to fire gas shells.

enfilade fire across division boundaries, run the CB campaign, and co-ordinate field artillery barrages. Corps was also responsible for organising bombardment plans so that the RFC could give the most benefit with both aeroplanes and balloons. In consequence, bombardment orders often came from Corps which camouflages the input from divisions. Despite nominally commanding a few brigades of field artillery, a good CRA could significantly affect an entire Corps bombardment plan. Furthermore, during an offensive a division would be supported by as much as three divisions worth of artillery, all of which would be under the direct command of the CRA of the division in the line. In 1916 this sometimes caused problems since the front-line CRA was expected to deal direct with each brigade, thus giving him perhaps eight or ten subordinates, wildly beyond any normal span of command.⁸ By 1917 it was common for sub-groups to be formed, of only two or three brigades of artillery and a CRA would give his orders through the sub-group commanders, typically CsRA themselves.⁹ The system caused some friction and led to a few calls for change, but GHQ was satisfied and focused their effort on solving the problems of the RGA.¹⁰ All this goes far to explaining how in 1918 a CRA could handle a reinforced divisional artillery and frequently a Brigade RGA.

The Corps

At the beginning of the war the Corps was seen as a 'postbox' HQ, elaborating upon orders passed down from GHQ to divisions. In keeping with this view, Corps HQ controlled no combat troops of its own, extra artillery being parcelled out to the divisions. The Artillery Adviser at Corps HQs lacked both legal authority to issue orders (unless troops were specifically delegated to him) and the staff with which to give effect to any orders he might have issued. This remained the situation until HARGs were organised early in 1915, but that was a change that had little effect upon AAs.¹¹ They were still advisers, consulted or not as the GOC saw fit. Several tried to gain and assert authority but it was a haphazard affair, depending again upon the Corps Commander. Some signed themselves as Brigadier-General, RA (their rank), some GOCRA (a function). Oddly, in some cases the same man would be both, having been allotted command of some artillery but only advising about the rest. In

⁸ This was due to the old bugbear of the British army, rank. The CRA of the attacking division might be junior to the CRA of one of the divisions supporting the attack, in which case he could not give orders.

⁹ The problem of rank was never answered, only avoided. Apparently no CRA dared try and pull rank.

¹⁰ Uniacke wanted to pull all artillery from Divisions, giving it to Corps which could have reduced the infantry's voice in planning by leaving out infantry brigades. Birch took no action; the BEF had enough re-organisations that winter, the artillery's share being RGA brigades. Uniacke Papers, RAI, U/I 'Lessons from the 1917 Battle Fighting ... from an Artillery Point of View'. (hereafter, Uniacke, 'Lessons of 1917')

¹¹ Sometimes the AA was put in charge of the HARG (only), creating a redundant layer of command. Hussey Diary, 20 5/15, RAI.

February 1915 GHQ reorganised artillery into three categories.¹² 'Divisional Artillery' was now field guns and howitzers and the few mountain guns; this was thought adequate to 'support the infantry both in attack and defence'. Medium artillery was called 'Army Artillery' and was attached by Armies to the divisions; it might migrate with a division or remain covering the same sector when the infantry changed. The few heavy pieces (over six inches) became 'GHQ Artillery', and were allotted to Armies 'to influence the course of operations after the battle has become fixed'; it was this artillery that became the Heavy Artillery Reserve Groups. In all this Corps gunners played no role whatsoever largely because the necessity for an intermediate command echelon had yet to be proven. Armies had existed a bare two months and there had been no fighting during their tenure.

In July, after the spring battles were over, the Artillery Adviser at GHQ (du Cane) pointed out to the CGS (Sir William Robertson) the difficulty CRAs were having. He requested 'superior artillery Commanders should be specially appointed ... "the very best men being selected and adequate staffs being provided"'.¹³ Du Cane had in mind the gradual assumption of responsibility, starting with the power to co-ordinate but later placing all heavy artillery under the command of the AA. Robertson had no fixed views of his own, and put the question to the three Armies with the dismissive caveat that even if they thought Corps artillerymen should be commanders there would be few times when the authority was necessary. Whatever the greater role Corps were playing in the life of the infantry, they were still clearly superfluous for the artillery. The Armies were no more than lukewarm in support, and all thought the circumstances requiring an echelon between Division and Army would be rare, although a special artillery commander had been appointed (or at least requested) for some of the BEF's attacks.

To be fair, in 1915 the shortage of shells and guns meant there was not a need for an intermediate commander. The BEF never had guns for more than a two-Division attack (as proved at Loos when insufficient artillery was not compensated for by gas) and a good CRA could handle that much artillery. It was clumsy for a CRA to handle two divisions of artillery plus attached heavies, but it was not impossible. While not anticipating any developments whatsoever, it was a fair reflection of the situation in mid-1915. Du Cane accepted the views of the Armies, having won support for granting AAs a tiny staff and some command authority, if only in limited circumstances. Du Cane was not seeking independence for the artillery, and

¹² OA2/11D, 26/2/15, WO158/275. Second Army took their own sweet time in implementing the order, almost six months. V Corps CHA diary (WO95/757), 8/3 15.

¹³ Rawlins, *History*, p5; this section draws heavily upon Rawlins, pp5-10.

spelled it out for Robertson 'If a Commander wishes for assistance or advice in connection with his artillery, he should receive it from his staff- as regards the employment of the arm and its organisation, from the General Staff ...'.¹⁴ The Battle of Loos fell into the cracks of this system: Rawlinson lacked confidence in his Adviser, but the same day he asked for Hussey's replacement GHQ gave the Adviser command authority when Corps Artillery was formed.¹⁵ As Hussey was not removed, Rawlinson had to work around him by never admitting the need for a Corps Artillery Commander, instead forming clumsy groups and sub-groups under the command of one of the CRAs.¹⁶ Plans then had to be co-ordinated by Rawlinson himself, in consultation with each divisional GOC and CRA, while to get heavy artillery support the HARG had to spread itself between all the divisions 'without reference to Corps' to avoid Hussey.¹⁷ Fourth Corps quickly sifted the wreckage of the battle plans. Budworth (promoted to IV Corps artillery after, as CRA 1st Division, having done the work for Hussey) wrote in coded language:

The Artillery plan of action should be a Corps Artillery plan ... It is distinctly preferable that the Artillery plan for the action of both heavy and light artillery should be drawn up by one officer. Rightly or wrongly, Divisional Commanders look to the Corps Artillery Commander ... and they did not understand why there should be divided control.¹⁸

GHQ promptly decided Corps did indeed need to have command authority and re-titled the AA 'General Officer Commanding Royal Artillery of the Corps' but still with co-ordinating responsibilities unless otherwise notified. This lasted only a few brief months before Haig's GHQ muddied the waters by creating the post of Commander, Corps Heavy Artillery. At the same time the GOCRA, Corps became the Brigadier-General, RA and receded to being solely co-ordinating. This led to great muddle, confusion and variation between formations. In at least one Corps the CHA refused to take orders from the BGRA, unless channeled through the General Staff. It was at just this time that 'Tavish' Davidson minuted to Haig that Fourth Army's Corps would need experienced gunner officers- perhaps to cut through the

¹⁴ undated memo (but mid August 1915), extracted in *Ibid.*, p7.

¹⁵ Gough, at this time commander of I Corps, blamed GHQ for taking three weeks to get this letter out. Rawlinson Diary, CCC, 1/9/15. Rawlinson favoured the idea of GOCRA, as long as the men chosen were good ones: 'There are plenty of them if they will only promote the junior ones'. *Ibid.*, 3/8/15.

¹⁶ Hussey never realised the manoeuvres to avoid him, being either monumentally dim or successfully isolated. After Loos he remarked that Corps artillerymen were receiving authority 'just too late for me'. Hussey Diary, 28/10/15, RAI. Hussey was relegated to CRA of 5th Division, his post until the Armistice.

¹⁷ Instructions Issued to IVth Corps Artillery by Brig-Gen CED Budworth 21/9/15, Montgomery Massingberd Papers, LHC, f42.

¹⁸ Remarks Based on Recent IVth Corps Artillery Operations, CED Budworth, 6/10/15, *Ibid.* Budworth's Somme experiences reinforced his views on centralised control: Some Artillery Lessons of the battle of the Somme, *Ibid.*, f48.

nonsense.¹⁹ Rawlinson rose above the problem by giving orders to ignore the change so that BGsRA could exercise command during the Somme fighting.²⁰ Birch pursued the matter with Kiggell, lining up support but only winning the argument in December 1916 after pointing out that many Corps and Armies had were using the BGRA as a GOCRA because 'the experience of warfare proved that to be necessary'.²¹ Birch was exasperated and wanted the 'bogey of dual control buried' pointing out there was no trouble on this score with the RFC. In December 1916, as noted above, GHQ returned the title GOCRA to Corps artillerymen, also bestowing it upon MGsRA at Army to forestall over-mighty subordinates. From this point onwards relations improved. Uniacke would complain at the end of 1917 that Corps Commanders should not be allowed to downgrade the GOCRA to an adviser, but there is little evidence this took place during battles.²² Most men got on with winning the war.

Over the course of the War the nature of the Corps changed considerably.²³ It began as theoretically only a post-box for orders, and for the artillery that situation lasted too long. In early 1915 steps were taken to anticipate some of the problems of handling large bodies of artillery. Anticipation was highly creditable, but the new methods proved inadequate. Unfortunately no action was taken during the quiet summer of 1915 and the Battle of Loos was fought with a system that was known by the main participant to be flawed. This undoubtedly contributed, if only slightly, to the shambles that occurred. Afterwards the problem was rapidly tackled, but artillery was the last element of Corps responsibilities solved. Corps had already become important administrative HQs and also organised all aspects of infantry operations. The decision had been taken that Corps were to be an immobile formation, through which divisions would pass; as far as the RA were concerned this allowed expertise to be developed about operational differences in each area. It is, unfortunately, impossible to discern what weight was given to this consideration in the decision that Corps should become part of the terrain. GHQ implicitly put all combat-support units on an equal footing by having one

¹⁹ memo, 4/3 16, WO158/19.

²⁰ conference notes, 6/4/16, Fourth Army Operations Papers v6, IWM. It is not clear what steps Gough took, but Uniacke, his MGRA, is unlikely to have looked kindly on troublemakers.

²¹ Rawlins, *History*, p10. Letter, Holland to Birch (Rawlins Papers, RAI), 24/8/16. The Canadians claim to have always used a GOCRA, avoiding these troubles. Nicholson, *Gunnery of Canada*, pp242-3.

²² Uniacke, 'Lessons of 1917', pp34-5. Perhaps some researchers into Corps will find the 'assault' Corps had better GOC-GOCRA relations; it is beyond the scope of this research.

²³ Mr A Simpson is researching the broader question; I try to restrict my remarks to the artillery.

officer to co-ordinate the attachment to Corps, allowing not just attachment of, for example, tanks, but other units that would be needed to help the tanks themselves.²⁴

1916 saw Corps developing far more control over their divisions, but some of that control passing up to Army. One reason Corps artillery became more important was the increasing depth and sophistication of the creeping barrage: once heavy artillery was involved, Corps had not to only participate but also organise.²⁵ After two months' experience during the Somme offensive, orders were drafted warning Divisions and Corps to stop changing artillery orders and allowing the higher echelons a greater say in operations.²⁶ This stayed true for the rest of the war, as on quiet fronts Corps handled artillery operations, while during attacks Armies ensured that all artillery operations were co-ordinated. Friction seems to have been remarkably little, suggesting that most senior artillerymen accepted the situation.²⁷ By 1918 it was possible for all the gunners of a Corps to shift effortlessly between three types of control, one for ordinary trench warfare; a second, more centralised, to handle a bombardment or barrage; and the third, more decentralised, for mobile fighting.²⁸

Corps Heavy Artillery

The heavy artillery of the Corps was in a different, and far less confrontational, situation. Very early in 1915 some heavy artillery had been taken away from divisions and entrusted to Heavy Artillery Reserve Groups. At first there was one per Army but this link fell away into a broadly (but not wholly) functional role, of handling CB work. The troubles that ensued, especially at Loos, foreshadowed the death of the HARGs. Someone would still have to take over the heavy guns and since Corps had recently been given control over the Field Artillery of their component Divisions, it was natural enough that Corps should have control over their allotted Heavy Artillery.²⁹ From the first, the Commander Heavy Artillery was a legally authorised commander, as HARG commanders had previously been. Clearly, it was not

²⁴ A GSO2 co-ordinated Army Troop Companies RE, Tunnelling Coys RE, Special Brigade RE, the RFC, Tanks and Artillery. WO106/359.

²⁵ CNF Broad, 'The Development of Artillery Tactics, 1914-1918', *JRA*, 49:2 (1922), p77. (hereafter Broad, 'Artillery Tactics')

²⁶ Rawlins Papers, RAI, 1162/12a c23/8/16, drafted, but apparently not sent. At about this time Fourth Army begins setting an Army-wide pace for the creeping barrage.

²⁷ Afterwards there were complaints that centralisation had grown 'until individuality was well nigh starved out of existence', an inevitable process in an organisation the size of the BEF. Weber, 'Mobile Artillery', p55.

²⁸ Nicholson, *Gunnery of Canada*, pp242-3. The Canadian Corps had some organisational advantages over British Corps, some of which operated much the same system while not claiming superiority.

²⁹ There was still delay: the MGsRA approved the CHA in January 1916, but it did not take effect until early March. Headlam Papers, RAI, 21 1 16.

foreseen the troubles this would cause his colleague, the BGRA/GOCRA. To make up these new CHAs, the HARGs were abolished and, since there were not enough to go around, some Corps had to create CHA HQs. This was less trouble than it sounds, for most Corps had unofficial heavy artillery HQs before they were authorised - it was simply common sense to have someone to control the heavy guns.³⁰ The men who were HARG commanders or CHAs were, with the singular exception of Herbert Uniacke, RGA men because they better understood the weapons and techniques. It was noticeable that whilst essentially only RGA men commanded heavy artillery, as the war dragged on RGA men rose beyond commanding just heavy artillery, rising to be Corps GOCRA and even an Army MGRA. By 1918 seven of eighteen Corps on the Western Front had had a siege artilleryman commanding all their artillery.

There was little change in HAHQs, simply the trickling addition of staff officers as the need became acute. In some ways the CBSO was a part of heavy artillery HQ but this was always a matter of personal relationships since the CBSO was technically only 'attached for counter battery work.' There was one proposal mid-way through the Somme offensive that CHAs should become part of the landscape, not changing sectors when the rest of a Corps HQ did but instead becoming experts on a certain area; this was quashed when Birch pointed out the necessity of confidence between Corps Commanders and their two artillerymen. Some authors would cast this as a 'personalised' rather than 'efficient' system of command, but as best as can be judged only one CHA was replaced when a new Corps Commander took over, so the system cannot have been overly personalised.³¹

Army Level Artillerymen

Before the War the British army did not have Armies; they were a wartime phenomenon and their MGsRA were as well. The original BEF split into First and Second Armies on Boxing Day 1914 and most of the staff appointments at GHQ were replicated in the new Armies. Artillery, however, was not among these, and early rumours had it that since one Army had a Gunner as its Chief General Staff Officer, he could advise his army commander on artillery matters too.³² Precisely how the other army was to cope was unclear but clearly unimportant. This state of affairs did not last long and it was only a month after armies were formed that MGsRA were appointed. At first their duties were light, for despite being graded as Major

³⁰ eg VI Corps CHA (WO95/784), c4/4/16; X Corps BGRA & CHA, (WO95/862& 866), 5/11 15, 2/3/16.

³¹ HO Vincent of X Corps was replaced two weeks after a new Corps commander arrived in July 1918. However, Vincent had held the post for thirty-one months and may have been tired.

³² Haig Diary, WO256/3. The absence of an MGRA bothered nobody; First Army's did not arrive until six weeks after the Army's formation. WO95/154, 16/2/15.

Generals, they were simply more senior Artillery Advisers.³³ In April 1915 duties were finally defined but it was a case of putting the status quo on paper:

As the duties of Artillery Advisers are not laid down in the Staff Manual or in Field Service Regulations ... they should be defined in order that possible misunderstandings should be avoided. Except as provided for below the duties of an Artillery Adviser are purely advisory. He is not a Commander nor is he a Staff Officer.³⁴

The exception was specially detailing the MGRA to some task or other, hardly efficient use of a Major General or of the artillery awaiting guidance.

So the situation remained through 1915 and 1916. Charles Budworth was the MGRA for Fourth Army, yet he does not stand out during the Somme planning. From the records, it is clear Rawlinson consulted Budworth but he spent more time talking with Corps Commanders and Archie Montgomery, the Chief of Staff, about artillery matters.³⁵ During a battle the MGRA was broadly like a conductor of an orchestra, playing no instrument himself but controlling the others. Conferences were held to make sure everyone shared information and to disseminate information that, due to other organisational quirks, was only held at Army.³⁶ Later, as everyone became accustomed to the system, many functions were delegated downwards, CB work being the most noticeable. During the Somme this was largely co-ordinated from Fourth Army HQ, but by 1917 the Corps were doing the work themselves.

The most significant time an MGRA stood up with a new plan, at Arras, he was sacked for running against GHQ's wishes. MGsRA had relatively little to do. They commanded the railway artillery; oversaw plans between Corps; changed Corps boundaries; and generally handled administration, including shell supplies. A more important function was distribution of artillery amongst subordinates, which required understanding the tactical problems facing each and balancing all against the supply of guns. Beginning with the winter of 1916-17 MGsRA laid down artillery policy for quiet times, trying to maximise the results from CB

³³ Rawlins, *History*, p1.

³⁴ *Ibid.*

³⁵ Montgomery was a Gunner, and may have given Rawlinson artillery advice. If so, there is no record of conflict between Budworth and Montgomery.

³⁶ The most important was air recce, since the RFC was organised into Brigades that corresponded with Armies. See R MacLeod's letter to Edmonds, 5/5/37, CAB45 136. Conferences also allowed information from a Corps' RFC squadron to be disseminated laterally.

work and harassing fire between offensives. Some also realised that better staff work - again especially at Army level - would permit more use of surprise through better control of fire.³⁷

Very rarely was an MGRA used in the original sense, commanding a particular concentration of artillery. HF Mercer took command of a large part of the artillery of First Army to support the Canadian Corps attack at Vimy, but that is the only significant example.³⁸ It did not happen in 1915, when it might be expected because Corps was much weaker, for infantrymen such as Rawlinson preferred to keep the guns in their own hands.³⁹ An MGRA's role in planning attacks was more elaborating than inventive, taking infantry-centred General Staff plans and organising the guns as best they could around the fixed features. Because an MGRA was not a commander there were not the arguments over establishing the post there has been over GOCRA at Corps. Of course, had artillery command been centralised at Army level, the argument would have raged there. Apart from a minor change of title, to GOCRA in December 1916, there was no real alteration in the post of MGRA at an Army.⁴⁰

Gunners at GHQ

The MGRA at GHQ started in much the same position as any other senior Gunner. He was an adviser who might be trusted with some task or other. The first, Walter Lindsay, has made no particular mark upon history. He was not called upon to command any body of artillery except for the abortive attacks in December 1914⁴¹ and even then Smith-Dorrien managed to sideline him. Lindsay's main duty was worrying about ammunition supplies, where his preference was apparently for shrapnel over HE.⁴² In early January 1915 he was sent home to use what experience he had accumulated as Inspector of Royal Horse and Field Artillery, his removal eased with a KCB. He eventually commanded 50th Division for a short spell before being shuffled off to be commander of some remote area.⁴³

³⁷ Broad, 'Artillery Tactics', p80. Broad was a staff officer to Herbert Uniacke, and Fifth Army was one of the first to have a winter artillery programme. This also casts an interesting light upon Holland's plan for Arras, for whilst Gough opposed Allenby's ideas, Uniacke filled in for the degummed Holland.

³⁸ WO95/168, 26/3/17.

³⁹ Rawlinson noted 'The allotment of tasks and objectives of the arty being coordinated + arranged under my own immediate direction & orders'. Rawlinson Papers, NAM, f7 'Note on the Attack of Neuve Chapelle, 18-2-15'.

⁴⁰ Nor was there much addition to their staffs until September 1918, which led to poaching officers from batteries as needed, to the detriment of staff work and the batteries concerned. Rawlins, *History*, pp16-17.

⁴¹ French Diary, IWM, 10/12/14, III Corps Diary (WO95/668), 11/12/14.

⁴² Lindsay to von Donop (MGO), 10 11 14, WO159 15.

⁴³ The RA Regimental List has him only as a Commander, meaning of something non-Regimental like eg Harwich Defences. He retired in late 1917, being kept on only a few months beyond statutory age.

His replacement was John du Cane, who spent most of 1915 acting as the intermediary between the Ministry of Munitions and the troops in the field.⁴⁴ He was hampered even in this by pedants operating 'the normal channels' who objected, in essence, to ruining the peacetime system by using it to fight a war.⁴⁵ Eventually he won the point with the support of the Ministry of Munitions, who preferred to talk about artillery with a gunner rather than Ordnance Services. Du Cane had the job at a thankless time but took sound steps to improve guns, shells, manpower and command arrangements. He took the first steps towards grasping the nettle of Corps-level artillery control despite opposition from many below.

Around the time Haig replaced French, du Cane was attached to the Ministry of Munitions to bring them some field experience, and was replaced at GHQ by John Headlam. Headlam had actually risen through the artillery hierarchy in the BEF, first as a CRA and then as MGRA of Second Army for nine months.⁴⁶ He and Second Army had opposed many of du Cane's proposals about the chain of command but he bore no grudges and actually expanded Corps artillery to include the Commander, Heavy Artillery. In fact during the course of 1915 there was something of a sea-change in Headlam's views, for in November he shook up Second Army's arrangements to create responsible artillery commanders at all levels:

it is essential to ensure a chain of artillery command that corresponds to the ordinary chain of command of formations- divisional, corps and army. When therefore a corps is employed as a whole in any operation the general officer commanding the artillery of the corps will, under the orders of the corps commander, make out the artillery plan, and will co-ordinate the action of the whole of the artillery. In the ordinary work of holding the line the general officer commanding the artillery of a corps will be chiefly concerned with the co-ordination of the work of the divisional and corps artillery, the latter of which is directly under his orders.⁴⁷

That autumn Second Army devised a number of re-organisation plans; it is remarkable that an Army was able, on its own initiative, to adopt such a different system. Presumably this was because GHQ was now leaning in the same direction, but the effect of GHQ pondering the

⁴⁴ Du Cane had staff experience from South Africa and various pre-war staff posts but was not *psc*.

⁴⁵ eg Director of Ordnance Stores, 30/7/15, 5/10/15 and 1/6/17. WO95/58.

⁴⁶ Barring an outside appointment, Headlam was the best option. First Army's MGRA had chosen to stay MGRA over taking command of a division and Third Army's had only been two months in the job.

⁴⁷ Second Army RA letter 763, 'Organisation of Heavy Artillery', 30/11 15: V Corps CHA diary (WO95/757). Second Army had been discussing the re-organisation of heavy artillery since the beginning of the month: Corps Commanders' Conference, 1/11/15, Headlam Papers, RAI, 183/8.

matter was really only delayed matters: Second Army had to postpone its plans for GHQ to make up its mind.⁴⁸

Headlam arrived at GHQ only a few days before Haig and held the post just a few months before Haig replaced him with the man he wanted for the job, Noel Birch. After the war Headlam wrote that he was replaced because he had got on the wrong side of Haig at a GHQ dinner in 1915, but his account does not answer all questions.⁴⁹ Despite being the odd-man-out in Haig's headquarters he worked hard, starting some of the projects that would bear fruit for Birch. As Haig shook up the whole BEF, making it face up to the prospect of a long war under trench-warfare conditions, Headlam started the process with the RA. The key event was the issue of the 'Artillery Notes' series of pamphlets, described in more detail elsewhere. The first item on the agenda at Headlam's first conference after Haig's arrival was creating 'a common doctrine'.⁵⁰ While Headlam had a reasonable record on training and doctrine at Second Army, the responsibility for common doctrine via 'Artillery Notes' seems to lie with Haig.

Despite a solid performance, Headlam was eased out of GHQ in favour of Birch, who was a clear protégé of Haig's.⁵¹ Haig slipped Birch into the first CRA post available, then up to Corps, Army and finally GHQ.⁵² Despite Headlam's work, Birch was dismissive of the situation of MGRA at GHQ:

When I first joined at GHQ I was told that I was an Artillery Adviser and I was ushered into a room containing two staff officers. There was not even a list of the guns in France in the office. There was no department to collect all the technical experience of other nations. Nobody watched the tactical development of the artillery and issued instructions for the guidance of people fighting in the line. As you know, we now have an office - no doubt an imperfect one - consisting of 10 officers. The office is divided into a tactical side, a technical side and an artillery intelligence side.⁵³

⁴⁸ Second Army Conferences, 22/11/15, *Ibid.*

⁴⁹ letter, Headlam to Secretary of Royal Artillery Institution, 15/7/1940, in AF Becke Papers, RAI military document 1115.

⁵⁰ Conference of Major Generals RA, 24/12/15, Headlam Papers, RAI, 183/8.

⁵¹ Headlam spent some time in untraced posts, then served in the War Office, including trips to Russia and America (on his passport giving his profession as Major General) and eventually with the Ministry of Munitions. Inexplicably, his papers at the RAI include many of GHQ's artillery files for 1918.

⁵² Birch's career closely parallels another of Haig's protégés, Hubert Gough. Birch was an artillery brigade commander in the Cavalry Division, then Gough's CRA, Gough's BGRA and advanced to GHQ at about the same time Gough was given Reserve Corps. Birch is less well known presumably because he did not fail, but it is worth giving Haig the credit for picking talented subordinates when he did so.

⁵³ Birch to Maxse 3/11/18, Maxse Papers, IWM, f66/1.

Birch was able to make changes because he had the confidence of the C-in-C, who was in favour of making changes to get the whole BEF squared up to fighting a long, hard war. The first job was to continue work on 'a common doctrine', and the production of pamphlets did not diminish. Birch also was dragged into discussions with the War Office about the number of guns required to win the war. This was more than an artillery question, for it depended on the type of war expected and upon the manpower available. Simultaneously, Birch was overseeing the planning of the Somme campaign and trying to predict how many guns would be needed to 'solve' trench warfare.

During 1916 Birch fought, and lost, a battle about the rights of artillerymen in the chain of command. Birch only sought enough authority for artillerymen (mainly MGsRA) so they could give orders to subordinate artillerymen, strengthening the control of the formation's GOC by strengthening the role of his artilleryman.⁵⁴ However, this would have been a hybrid between the staff officers - who had no combat troops - and the subordinate commanders - who were not staff officers. Practically the question boiled down to an MGRA signing his own letters. On paper it would have been a small step but raising the question of divided command was a giant leap and Haig did not back Birch against the inertia of the system.⁵⁵ Birch was not a radical, and failed to persuade the critics that his proposals were within the spirit of the system of the day. Thus, while eventually retitled MGRA (from AA), building an efficient staff and solving many of the artillery problems of the BEF, Birch was always to be subordinate to the traditional Staff departments. But he did not think this was wrong and did not try to recast the artillery into the leading arm within the British army. After the war he wrote 'what good would the artillery have been on the 8th of August, without stout infantry to hold the ground which tanks, aeroplanes, cavalry and guns had assisted them to win?'⁵⁶ Instead, Birch specifically restricted himself to urging the General Staff 'that higher formation commanders must really study artillery tactics of the present war;' having done so they would be better commanders but even if their superiors failed to study, it was the duty of artillerymen to be loyal subordinates.⁵⁷

⁵⁴ Uniacke Papers, RAI, U/III/13, memos to Kiggell of 8/6/16 & 29/7 16, attached as appendix 1.

⁵⁵ Part of the troubles about recasting the MGRA may have been concern over weakening Corps vis-a-vis Army once Corps had been decided upon as the main echelon of operational command.

⁵⁶ Birch, 'Artillery Development'.

⁵⁷ Anstey Galley Proofs p193, letter Birch to Furse (Director of Artillery, WO), no specific date given but between January and August 1917.

By the end of 1917 the duties of the MGRA at GHQ were codified: he acted 'as Adviser to the three principal Staff Officers on all artillery matters', while being allowed to write directly on technical matters (only) to all and sundry.⁵⁸ In 1918 Birch won minor bureaucratic battles with the Tank Corps and the Director of Gas Services, but the artillery's subordination to other arms was never again debated.⁵⁹

Birch himself saw his job as divided in three parts, tactical, technical and intelligence. To handle these was well beyond the ability of any man and Birch built around himself an able staff, one which he worked as hard as himself.⁶⁰ Building a staff at GHQ had been a slow process for the Gunners, reflecting the difficulties the Adviser had in his netherworld between staff and command. At one point the Army Council had decided to interfere by suggesting a heavy-artilleryman be attached to GHQ, although whether subordinate to or a rival of the AA was unclear. Sir John French saw off the proposal by a little praise of the incumbent and very little else happened to the AA's staff during French's tenure.⁶¹ Tracing the personnel of GHQ artillery staff is difficult and the functions are even harder to discern, as the lists are mere nominal rolls.⁶² By June 1918, which must represent very nearly the final design, there was an MGRA, a BGRA, an Assistant Director of Artillery, two GSO1s, and five juniors.⁶³ The BGRA was almost certainly a deputy, while the Assistant Director seems to have worked with technical matters and especially heavy artillery. One of the GSO1s was responsible for liaison with Allies; this may have been upgraded from earlier in the war once the Americans arrived needing all the help they could get. Three years earlier there had been only four men in the office, the MGRA, a Lieutenant Colonel RA and assistants for each. The grading of artillery staff officers caused almost as much trouble as the position of their seniors. Sticklers for the niceties insisted for several years that RA staff officers could not be graded as GS officers, as

⁵⁸ Rawlins, *History*, pp3-4 and Appendix A.

⁵⁹ After the war the Report of the Committee on Staff Organisation said The senior artillery and engineer officers with formations are rightly appointed as Commanders and advisers with power of inspection. They cannot be Staff Officers, and their orders to lower formations must go through the Staff. On purely technical questions they should be entitled to correspond with their opposite numbers in the lower formations ...' Boraston Papers, IWM. Essentially the British Army operates the same system today: MJ Tomlinson, 'Handling Artillery Within the Corps', *British Army Review* 75 (1983), pp.5-15.

⁶⁰ I am grateful for the comments of Mr PGW Annis, author of the New DNB entry on Birch. Birch viewed a staff as decentralising, not like the previous personality-run system. Birch, 'Artillery Developments'.

⁶¹ WO32/5152, draft letters from WO to French 3 15; French to WO 27 3/15

⁶² *Composition of Headquarters British Forces in the Field* (titles varied slightly), various editions.

⁶³ Interestingly, almost all anti-aircraft work (a BGGs with a GSO2 and GSO3) was part of the Staff Duties section at GHQ, not the MGRA. Rawlins, *History*, pp14-16, covers some of the changes to GHQ's artillery staff, including its reduction by one in early 1915, as the DOS fought his corner, if not the Germans.

they did not handle GS material and must be DAAGs, even though they did not do Adjutant's work. Eventually in late August 1917 they were allowed to be General Staff officers.⁶⁴

Tactical information was gathered through visits to formations, special questionnaires and after-action reports. The last were only patchily used although more common earlier in the war, and seem most common from Dominion formations, both Corps and Division.⁶⁵ While Canadian Corps definitely saw itself as a unit apart, it may be tentatively suggested that ANZAC units felt a greater need to spread ideas, as their cadre of regular officers was smaller than in British units.⁶⁶ Sometimes these reports were produced after operations which the formation felt were discrete: Vimy Ridge, the advance to the Hindenburg Line, Messines, or just completing their spell in the line during an attack. Cambrai was something of a special case, since there was a formal Court of Inquiry, but it did not focus on artillery. More frequent was consideration of artillery in a broader after-action report, or one linking the artillery with, for instance, the RFC. Special questionnaires were used mainly in 1918 to enquire into the events of the retreat. Visits by senior officers generally took place before or during operations; as long as operations continued somewhere, visits were most likely to the scene of the action, not to formations in quiet sectors. Still, a considerable amount could be learned while operations went on, at least by those at a sufficient remove from the day-to-day concerns. There were also occasional trips by supernumary officers to recent battlefields, and liaison visits to the French. Of course conferences during operations were a way for senior officers to acquire information and spread ideas.

For GHQ to apply tactical information was relatively rare, as it was so many levels removed from the battlefield. The most common advice seems to have been what lines were most defensible from an artillery point of view. Thus Birch cast his eye over winter defensive lines as early as 15 August 1916, or commented on some notes about holding salients.⁶⁷ However, this is likely a selection error in the material, for defensive schemes were written down whilst offensive tactical advice would have been verbal at a conference. One area where the MGRA

⁶⁴ *Ibid.*, 13-14.

⁶⁵ IV Corps wrote a report after Loos, Fourth and Reserve Armies after the Somme: Montgomery - Massingberd Papers, LHC, ff 42,48; WO158/344. Vimy and Messines were both followed by reports, being very much set-piece battles. On the Canadians, see Bill Rawling, *Surviving Trench Warfare: Technology and the Canadian Corps, 1914-1918*, (London: University of Toronto Press, 1992), especially pp85, 132-3 and WO95/1059-60.

⁶⁶ According to information kindly supplied by Dr John Bourne, Australian CRAs had such martial pre-War careers as carpenter, pharmacist and architect.

⁶⁷ Rawlins Papers, RAI, 1162/12a; 1162/12b, 10/2/18, which was clearly the lessons of Cambrai.

did affect battlefield results was in the distribution of artillery. From the middle of 1916 tables were kept reflecting how many guns each Army held, with calculations working out the density.⁶⁸ From 1917 there were definite rules of thumb as to how many guns would be needed for an attack and for defence. From their charts GHQ could tell at a glance how many brigades of field artillery could be removed from each army, what the effect of removing brigades would be, and the effects of adding brigades. Thus, if an attack required a certain gun density, guns would have to be removed from other armies and the risks that would have to be run on those fronts could be weighed against the attack.

Technical information naturally came up through the chain of command, for complaints (far more common than praise) about equipment could only be solved by those above the users. Once munitions production achieved a reasonable rate in 1916 attention turned to quality; GHQ served as the natural medium for communication with both the WO and the Ministry of Munitions. Suggestions and requests from the Front and London would be funneled through GHQ, subject of course to being quashed at any level. GHQ never had its own technical investigations (Operational Research in a later war) but by the winter of 1916-17 practical test results were arriving.⁶⁹ These largely referred to the effects of projectiles in various applications, a crucial matter for determining what shells were suited for which purposes. The reports dealt with the spread of shrapnel at various ranges, the fragmentation pattern of HE shells,⁷⁰ lethal radii of shells, wire-cutting results and performance against defences, especially pillboxes.⁷¹ Meanwhile, efforts to improve guns were dealt with by the Munitions Ministry and manufacturers who would respond to requests for improvements from GHQ.⁷² Through all this the job of the MGRA's staff was to stay abreast of technical developments so tactics could be adjusted as necessary. Considering the constant tactical and technical improvements of British artillery in the war, the job was well done.

⁶⁸ *Ibid.*, f13 'Calculations on and Records of Allotment of Artillery'.

⁶⁹ A tiny amount had been done early in 1916, clearly preliminary to the Somme offensive, about how prolonged firing affected guns. Unfortunately no copies of this research (predecessor to SS114) have been traced.

⁷⁰ both of these strongly affected the creeping barrage, and which shell should be used.

⁷¹ Pillbox tests gave information that worked both ways: British pillboxes protected only against shells up to 6", since a larger shell's concussion left the men too shaken to be useful. Peter Oldham, Pill Boxes on the Western Front, (London: Leo Cooper, 1995), p113.

⁷² see IV Hogg and LF Thurston, British Artillery Weapons & Ammunition 1914-1918, (London: Ian Allen, 1972), for information on the progressive improvements in ordnance.

Intelligence was the third part of Birch's GHQ staff although it seems to have employed the fewest officers. At GHQ level artillery intelligence was nothing more than the collation of reports from below, casting an eye over them to see if there was any new pattern evident from a higher level. Birch's intelligence staff watched how far forward or back German guns were held, information providing clues about German intentions and tactics. Artillery intelligence was only a part, albeit a very important part, of the entire intelligence picture. Through 1917 GHQ monitored how many guns the Germans deployed against British attacks, not only to help in attack tactics, but to ensure proper distribution of British CB pieces. When expecting a German attack in 1918 the situation was reversed and GHQ put even more effort into artillery intelligence, largely through misunderstanding German plans. British expectations were for the Germans to mount an offensive in the same mould as a British offensive, with a prolonged preliminary bombardment. Tracking German artillery was important, but there would still be some tactical warning. Of course, things went wrong for Fifth Army but an example of proper intelligence work and anticipation was provided only one week later when the 'Mars' offensive was crushed on the first day. Later in 1918 artillery intelligence grew in importance, as it became clear that most German offensives would gain considerable ground provided they had surprise, until every GHQ intelligence summary included a section of German artillery activity.⁷³ There was not enough German artillery to mount two attacks, and intentions could be tracked by following the reinforcing artillery from place to place. Once the Germans lost the initiative artillery intelligence played its role, first in attrition of the German forces, then in selection of places for British offensives. For instance Fourth Army paid very great attention to the number and types of German guns facing them, checking for any hint the Germans expected an attack near Amiens.⁷⁴

Such was the use of artillery intelligence at GHQ, but intelligence work extended down throughout the BEF.⁷⁵ At the beginning of the war there was virtually no structure to handle artillery intelligence which did not exist as a separate category. If gunners lacked intelligence about where enemy guns were, they could simply use their binoculars: guns were expected to be firing direct. Soon enough gunners were using indirect fire to save their lives and artillery intelligence had to be created. At first it was the preserve of the HARGs since they had complete responsibility for counter-battery work.⁷⁶ Lacking anyone official to collect and

⁷³ see the summaries in the GP Dawnay Papers, IWM.

⁷⁴ Fourth Army War Diary, WO95/436.

⁷⁵ This section draws heavily upon Rawlins, *History*, pp20-27.

⁷⁶ Intelligence and CB work went hand-in-hand except at the rarified level of GHQ.

collate information, the task was handed to the HARG commander's ADC. With more sources of intelligence - Flash Spotting, Sound Ranging, ground observers, RFC, Kite Balloons - the task grew too large and in 1916 intelligence officers were appointed to Corps Heavy Artillery HQs.⁷⁷ These were intelligence officers, not artillery officers, because Headlam felt it was more important to get the work underway rather than argue about capbadges.⁷⁸ Perhaps Headlam did not realise what he was signing away, for immediately these officers appeared, their duties were defined by the chief of intelligence at GHQ, who made quite sure the artillery intelligence officers were part of 'I' and only passed their reports to artillerymen. It sounds a small matter, but it meant among other things another set of forms to be filled out daily, since the Intelligence Officer did not see artillery reports. The arrangement broke down in well under six months, with Rawlinson complaining the non-gunners were technically illiterate and 'it is the artillery point of view which is paramount'.⁷⁹ Charteris put up a furious rear-guard action, arguing the intelligence officers had helped him greatly - whether they helped the artillery mattered less to him - and feared losing control of even part of his empire. Eventually Birch won the argument and GHQ's recommendation to the WO was that every level of artillery staff should have an intelligence officer. This was accepted in essence, but to avoid Charteris' grasp they had to be called 'Reconnaissance Officers'. In January 1918, with Charteris' removal, Birch seized the initiative. He ordered the Armies to report their intelligence to him - MGRA rather than 'I' - and used his possession of the field to negotiate a better agreement with Lawrence, the new head of 'I'. Perhaps Lawrence realised what had happened, for Birch was never able to win the next stage of his campaign, to get artillery intelligence officers graded as GSO2s or 3s.

So from bottom to top artillery, as so much else of the BEF, had different command and staff structures at the Armistice. These had been changed because circumstances dictated; in virtually no case was the change proactive. The one exception was creating fully staffed Heavy Artillery Reserve Group HQs, but unfortunately the question of field artillery command was not addressed until later, until the system had clearly broken down. The key time for changes was the winter of 1915-16 and the credit must be shared between John Headlam, Curly Birch and Douglas Haig. They built the new system which gave gunner officers enough authority to make tactical improvements and adopt new technology. Bureaucratic infighting dogged every

⁷⁷ However, the British army being as practical as it is, at least some Corps already had unofficial detachment of an intelligence officer to handle the artillery. III Corps BGRA diary (WO95/689), 14/11 15.

⁷⁸ Some of the regiments involved were quite extraordinary: VIII Corps had an hussar attached, IX Corps a Royal West Kent subaltern. WO95/825, 841. Headlam had minuted 'What is wanted is an intelligence officer, not necessarily an artillery officer', and that is exactly what he got.

⁷⁹ Rawlins, History, p22.

change - proposed or realised - in the artillery chain of command and it must be said this was a complete waste of effort. None of the men involved was trying to build an empire, to separate the artillery from the rest of the army, or even to significantly alter the role of artillery vis-a-vis other arms. Birch once protested to Horne '... I do wish other arms were not so afraid of our poor down-trodden Regiment. They are as keen if not keener than anybody else to win the war and are most anxious to do it', which may have been a bit over-egged, but epitomised Birch's attitude and, as he was the senior artilleryman, his views influenced the whole BEF.⁸⁰ Yet even those who could be as conservative as Birch sought evolutionary improvements, adapting to the problems of the day. The greatest change was the same as for many other units: a slightly separate chain of command, parallel to the ordinary infantry/General Staff chain. Most of the new weapons (gas, aeroplanes, tanks) obtained the same thing, senior airmen and tankmen were in touch with their juniors without going through someone else. However there was more concern about the artillery. Perhaps this was an unconscious compliment to the gunners, that they mattered more than a few men with gas cylinders. More likely it was the difficulties always encountered in changing a bureaucracy, rather than creating one from scratch. The constant goal of the senior artillerymen was to use artillery efficiently to help the rest of the BEF. Their reorganisations were always to that end and once their system was reshaped the artillery worked as well as possible, subject always to someone else's final decision.

⁸⁰ Birch to Horne, 19 10 17, Anstey Papers, RAI.

Conclusion: The Artilleryman's Place

In examining success there can be two criteria: either achieving targets set, even if they fall short of absolute success; or absolute success itself. Historians have generally examined the Royal Artillery's role in the First World War in terms of absolute success, and further measured it against disillusioned views of that war. Thus artillery has become embroiled in debates of how the war should have been fought, implicitly assuming it was fought the wrong way and that the ultimate victory of 1919 was tainted. Yet the imposition of this view on the evidence will automatically distort the results, for it takes little account of the views of the participants, the people actually making the decisions. Instead, this dissertation has been an attempt to measure the success of the artillerymen against their own goals, goals that changed over time.

At the time, the British army divided itself into the combat arms, those who supported them, and various non-combatant organisations. Infantry and cavalry were naturally combat arms; equally naturally the Royal Army Veterinary Corps and Army Pay Department were among non-combatants. The Royal Army Medical Corps were non-combatants despite performing some of their work under fire in - or even beyond - the front line. For the Royal Engineers and Royal Artillery the situation was murkier. Engineers used their specialist equipment and knowledge to help all parts of the army, and would down tools and fight if necessary. Their attachment to combat units also emphasised that they were a combat support rather than a combat arm. The case of the artillery was rather different. Their specialist tools were weapons, so there was no changing from one to the other. Yet for the most part artillerymen would not be in the front line, would not come to grips with the enemy. There was no question that gunners were fighting, but were they a combat arm?

Gunners' views of the role of artillery in the army are the critical starting point for judging what they should have done. At the time, senior artillerymen - those senior enough to affect policy - almost unanimously believed artillery should support the combat arms, but was not itself one. This answer was reached, not through philosophy but practicality: artillery fire, by itself, neither gained nor held ground; in exceptional cases it might win battles, but certainly not wars. Although the quotation referred to the infantry, 'fire superiority makes the decision possible' but was not itself decisive, was the general view of artillerymen.¹ The assumption was so wide-spread it was generally unspoken during the war, although it was discussed beforehand when new equipment was adopted and doctrine evolved to suit it. The corollary to this view

¹ Bidwell and Graham, *Firepower*, p27.

was that artillery should do whatever it could to help the troops in contact with the enemy, doing what those troops wanted even if that was not necessarily the best thing from a gunner's viewpoint.

This was the combined product of pre-war theory and practice. Artillerymen had closely examined their performance in South Africa to draw clues about how better to fight in Europe. South Africa had very definite lessons but was not the only influence. These deliberations then combined with the new quick-firing guns to reverse the practice of South Africa where the artillery had been forced to fight separately from the infantry and cavalry. This had worked badly in South Africa, and the artillery were right to try and do better, but were wrong to assume that gunshields - a few millimeters thick - obviated the need for better communications. These were neglected in favour of voice command by proximity. Foreign experiences and ideas were not ignored: British observers watched the Russo-Japanese War closely, and French artillery doctrine heavily influenced the Royal Artillery. All this, but especially the new technology, combined into a return to the old style of operations, close support. In doing so another opportunity was lost: nothing could be done if the predictions proved wrong. The system was overly decentralised, yet lacked the means to centralise and it would be years before the authority was granted, let alone means developed.

While wide-spread, the subordination of artillery was not a universal view, and the exceptions ought to be re-examined, especially due to historians' comments. There were two general exceptions to this view: complete re-thinking of warfare early in 1915, and exemptions for individual battles based on specific localised conditions.

Early in 1915 many senior generals contemplated how the war should be fought, wondering if trench warfare was not some entirely new kind of fighting that called for abandonment of previous military thinking. Typically they thought of large amounts of artillery doing most of the fighting before the infantry advanced, what would later be termed 'artillery conquering, infantry occupying'. Yet these grand schemes all foundered on the shortages of guns and shells at a time when much smaller battles had to be waged hand-to-mouth. Once discarded, the possibility of fundamentally altering the army's way of fighting was not readily re-examined, especially as the war developed its own momentum.

Secondly, there were calls for particular battles to be fought with more artillery and less infantry, or at least for the work to be re-apportioned. Yet most of these calls were not by artillery officers, but formation (army or corps) commanders. It was Rawlinson who wanted to limit the first attack on the Somme, not Birch or Budworth. Home set limits on the advance up Vimy Ridge, and Currie chose to fight at Hill 70. Naturally these generals had taken advice, but the decision was theirs, not a parochial artillery decision.

In abstract terms, once artillerymen decided their role was to support others, the next question was how best to do so. Artillerymen generally offered support however it was requested instead of conceding the principle but balking at the practice. Thus bombardments might be long or short, as formation commanders wanted. CB might be a low or high priority, the creeping barrage would advance at a pace others determined.²

Yet 'supporting as requested' did not mean never developing beyond the methods of 1914 because the supported troops had not heard about new possibilities offered by new artillery techniques. Rather, it meant educating the rest of the army about the tactical possibilities opened up by new artillery techniques. If developments in other arms were not in step there might be a delay before something new from the artillery percolated through to operations. Thus predicted fire, a technique developed in mid-1917, was not widely used tactically until married with tanks to produce the battle of Cambrai. Furthermore, the preferences of the supported arm had to be humoured, at least until new ideas had permeated to produce a new orthodoxy. So the infantry were given the creeping barrages they craved throughout 1917 when by later in the year there were perhaps better ways to provide support, and other things for the guns to be doing; 1917 also saw cases of over-bombardment. Not until the following winter was there much change from uniform creeping barrages and even that change was partly reversed in 1918 due to heavy casualties diluting the infantry. It might also be that the requests for support changed rapidly, as with tanks needing increasing protection against AT guns.

In the circumstances artillerymen had a choice: to do what was requested, after explaining their situation; or to attempt to over-ride the views of the men facing combat. They chose the former, or else memoirs and histories would have a very different slant. Birch himself felt this point most keenly, relieving his frustrations in a letter: 'I have never ceased rubbing it into the General Staff that higher commanders of formations must really study artillery tactics of the present war type.'³ Since artillery tactics changed, this meant senior commanders continually studying and changing their opinions.

Birch's lament shows many commanders were more than willing to issue orders without such study. Rawlinson, when planning the battle of Neuve Chapelle, first disagreed with the ideas produced by a gunner conference, then cajoled Haig into agreeing with his own

² It is noticeable that by later 1916 however often the infantry 'lost the barrage', they did not blame the artillery for failing in its role.

³ Birch to Furse (Director of Artillery, WO), mid-1917, quoted in Anstey Galley Proofs, p193.

ideas.⁴ Rawlinson can be excused for not studying artillery tactics in detail, as there was hardly any precedent to study. Fifteen months later Rawlinson planned the Somme offensive with his Chief General Staff Officer and MGRA; it happens they were both gunners, but they settled the matter amongst themselves and then left the juniors - with more front line experience - only to handle the details.⁵ The next year Haig, for all that he listened to Birch, might not grasp the full situation. Examining the thorny situation of the coastal sector around Nieuport, Haig came to the right decision but muddled the reasons.⁶ These examples could be multiplied to little purpose; this is one point upon which almost all histories justifiably agree.

At the same time it was not a question of the artillerymen allowing the infantry (or any other single interest) to dictate operations. Artillerymen had views, which they did not shy from presenting. Hugh Tudor admitted, or perhaps boasted, of his subterfuges as CRA of 9th (Scottish) Division, and his preferences strongly affected that Division's barrages.⁷ Birch despaired of infantrymen who depended on a 'creeper ... [to] take them to Berlin.'⁸ Kirwan and Budworth played key roles in preventing heavy losses in the Nieuport area by obtaining an exception from the BEF's ordinary vigorous CB operations.⁹ The infantry certainly did not have things all their own way in planning. Complaints were rife that attacks were launched - and their lives hazarded - without adequate preparations, without support, without rest or in inclement weather. Higher commanders had to weigh these risks against other intangibles: domestic political pressure, alliance pressures, weather prospects and their own theories of military operations. All this took place in circumstances of more uncertainty than most historical analysis and it is understandable, while still lamentable, that judgements were not perfect.

The short debate whether the war was a special circumstance that overturned the old subordination of artillery was still taking place when the BEF launched its first real trench-warfare attack, and the bombardment planning reflected it. The development of bombardment theory and practice wavered over the subsequent years depending not so much what was

⁴ Rawlinson Diaries, CCC, 3 & 5/3 15.

⁵ *Ibid.*, 1/6/16.

⁶ WO158/239, Fourth Army to GHQ 2 6/17, with Haig's marginal notes.

⁷ Tudor diary, March-April 1917; see Griffith, *Battle Tactics*, p141 for details of some of 9th Division's barrages.

⁸ Anstey galley proofs p140.

⁹ Rawlinson diary, 25/5/17; XV Corps diary (WO95/925), 8-9/1917.

thought of the artillery, but what the infantry needed done for them. Gunners did what they could to help the infantry, even if that usually proved inadequate. There were times when it was known the artillery would be inadequate, perhaps most obviously at Loos, but even then there were powerful reasons to attack and the decision lay more at GHQ than with any Brigadier-General, R.A. At first hopes were that the guns need only sweep away obstacles between the British infantry and their German opposites. This quickly failed, and destruction to varying degrees was necessary. The amount of destruction, and the relative importance of various target categories would vary, depending not on the artillery but on the troops supported, and of course the Germans. When British infantry were judged so poor that tactics meant lines steadily advancing, more destruction was obviously needed. The gunners did what they could. Tactics rapidly improved and more discrimination could be used, becoming necessary as German defensive tactics simultaneously evolved. Technical skills in the artillery improved too, over time allowing more sophisticated employment, but because it was a supporting arm, adoption of new artillery tactics generally waited upon other arms. Infantry skills and weaponry improved over 1917, allowing a shift in use of artillery from blowing a hole for the infantry, to fighting a deeper battle, even shifting away from bombardments into other facets of artillery work. This continued through 1918, although with limitations when infantry battalions were absorbing young, semi-trained or Category B men to replace losses. When the infantry could not perform as their predecessors, artillery stepped in to render assistance as it had before. Experienced formation commanders knew the characteristics of their units and used infantry, artillery, tanks, cavalry and aircraft more effectively and efficiently than they had done two years previously or would do twenty-two years later. Thus the use of artillery bombardments had changed, a change not wrought primarily from within the artillery but from changes in the whole BEF.

Counter-battery fire changed similarly. Originally it had been thought of as an artillery duel, batteries firing at each other for no apparent reason, as if they were chess-pieces canceling each other out. Had the artillery intended to fight a different war, it could have turned CB work into just such a private war. In the early stages of the war the Germans had more and heavier guns, and protecting British troops was the primary CB task. It never declined. Instead, as German defensive tactics changed to using more artillery (indeed firepower) and less infantry (or manpower) the BEF put more and more effort to CB work. So important was it that Haig checked details of planning, and perhaps the apogee was the possibility of blowing the mines under Messines Ridge simply to provoke the German artillery. Much of the effort that in earlier years had gone into bombardments was switched into CB, reflecting the success of those earlier heavy bombardments. Technical and organisational changes came thick and fast, but throughout the upheavals and despite the autonomy of

Counter-Battery Staff Officers, the purpose and practise of counter-battery work stayed firmly as protecting others.

Barrages of fire were developed during the war to support the infantry, a new method replacing older forms of support during an attack. They developed because the support was necessary, the assumption that British infantry would only need a bombardment to prepare their attack collapsing almost at once. Experience showed British infantry lacked the integral firepower necessary, even after the German defenders had been bombarded for days. So artillery was called upon for another service. Once there were enough heavy guns to adequately bombard, barrages became almost the sole function of field artillery. Meant as infantry support, barrages naturally developed in tandem with infantry tactics. They grew heavier and heavier mainly because the infantry did not yet trust their own skills and demanded as much assistance as possible; changes in German tactics also encouraged retaining as much support as possible. Considering the casualties sustained even when all went to plan, this was justified. Yet when conditions changed, barrages could be changed. This might mean speeding them up in 1916 in anticipation of a breakthrough, thickening them in 1917 when the Germans reverted to manpower-intensive defences during Third Ypres, or switching between thick and thin during 1918 according to the quality of the British infantry - and the opposition. Because the whole purpose was to support them, the infantry would always be the over-riding factor for barrages. But stereotyped barrages were not fired simply because requested. Gunners supported, but tried to do so as efficiently as possible. After the war a gunner and former staff officer reflected 'Barrages we were never able to dispense with; in fact they were so much in demand that it almost needed interference from the G.S. to limit that demand.'¹⁰ Even when the artillery wanted to switch to more productive targets, it was part of a combined-arms team that had to compromise together.

Defensive artillery work languished from 1915 to 1917 simply because the Germans seldom attacked. Defensive tactics therefore ossified, and were mainly rigid resistance, with artillery doing whatever was demanded. After this hiatus, it is all the more creditable that defensive thinking developed rapidly over the winter of 1917-18, if still based largely upon the practices of ordinary trench warfare. With artillery fire spread evenly, but everywhere too thin to prevent breakthroughs, rigidity was now costly. This failed; the BEF was surprised, and immediately the artillery was stripped from infantry control. Instead higher echelons - which could better judge how to combine forces - controlled artillery and infantry in line with the needs of the whole battle. Some offensive tactics were applicable in defence which only emphasised the continuity of fighting, rather than artificial divisions of attack and defence.

¹⁰ F.W.', 'Artillery and the General Staff', *JRUSI* 64:455 (8/1919), p475.

Centralisation, and hence consultation, came late to defensive fighting, but once in place combined-arms planning and fighting became the norm here too.

Had there been a collective wish to change the role of the artillery within the army, then ways could have been found. Arguably, the circumstances of the war would have given every support for changing, and behind the lines opportunities for change could have been created, away from the pressures of battle. Yet artillerymen did not alter matters.

There was no attempt to re-shape training to place more emphasis on the artillery, nor to dissociate it from the rest of the army. The initial trouble was turning enthusiastic volunteers into professional artillerymen, a process that took place in battles and lulls alike. It was actually the winters, free of major campaigns, that allowed training to be improved as officers could be spared to learn more of their trade than daily duties. This was exploited by the powers-that-be to spread new techniques throughout the artillery, first overcoming the patchwork of units of differing abilities left over from 1915, then preventing any return to that state of affairs. Simultaneously, they were not just raising the technical standard of gunnery but also reminding gunners of their real purpose: altering the course of battles. Increasingly, tactics were taught so artillery officers could take part in, and thus influence, battle planning. As the war was winding down, possibly more a time for satisfaction than criticism, Birch wrote 'One of the great drawbacks in this war has been the want of any tactical knowledge or training ... of officers of the Garrison Artillery ...'.¹¹ This might be read as the revenge of a horse-gunner but Birch's wartime career showed no inclination to accept second-rate technical or tactical standards. Rather than be a stick in the mud, he worked artillery units into a condition where they could aid the troops in combat, eschewing ideas of fighting the war differently until he could persuade the infantry, cavalry, tanks or whomever also to fight the war differently. By the time an Inspector General of Training was appointed (June 1918) it was too late to restructure matters radically, and anyway the most important publications were produced over the winters of 1916-17 and 1917-18. These had already provided first technical, then tactical, training. They did not waver from the view that the artillery work with, and for, others.

When newer arms like the RFC/RAF and tanks were creating their own staffs and command channels the gunners did not. There was a brief flirtation with the idea, but once the principles were explained, the gunners consciously drew back. After the war, when army organisation was examined in light of all that had passed, the artillery's position was revised,

¹¹ Birch to Horne, 21 10 18, Anstey Papers, RAI.

but not until then.¹² There were still substantial and critical changes to the artillery chain of command, changes necessary not just because of the failure of the pre-war organisation, but stemming from its lack of flexibility. Thus in 1914 and through 1915 *ad hoc* formations were created outside the proper organisation because it could not cope with circumstances. These were unsatisfactory in themselves and unsustainable across a growing BEF. So, in 1916 legal alterations were made that solved the worst of the problems; from then changes were fine-tuning. Much of the improvement in artillery co-operation came through having a proper command and staff organisation, but only after experience had shown how best to use it. Some of the minor adjustments gave the impression of empire-building, but the real step to independence was consciously rejected. Birch had wanted to sign his own letters, but this innocuous move would have removed the artillery from the responsibility of the General Staff and weakened the authority of formation commanders. Whatever it is now fashionable to think of staff officers, Birch thought them in a better position to judge relative importance than separate commanders and thus dropped his request. In comparison, the tanks and aircraft each had their own corps, the RAF later leaving the army. Even the Royal Engineers, the other combat-support arm, had Chief Engineers with, in some areas, more autonomy than artillerymen. By contrast the artillery stayed - consciously - in a supporting role even while the execution of 'support' changed dramatically.

Some authors have suggested the artillery worked especially with the infantry, to form an infantry-artillery style of warfare to the detriment of other arms and the army as a whole. After the war Birch wrote: '... the Artillery ... [did] everything possible to support the infantry, which was of course their job.'¹³ Yet to take this at face value - infantry only - and leave out the rest of the BEF would be wrong. This dissertation has stressed the attempts to operate combined-arms warfare, in contradiction to this hypothesis. It is therefore important to examine co-operation between artillery and the non-infantry arms of the BEF.

Seeing itself as a supporting arm, it was incumbent on the artillery to support any troops in contact with the enemy, whatever form that contact took. The case of the infantry (or dismounted cavalry) was simply the most likely, given the percentage of the army they represented. Yet in 1914 and 1918 mounted cavalry had its RHA batteries operating in close support. In order that this support be the best possible, to shake off the mud of the trenches, during the middle months of 1918 the horse artillery was taken out of action and refreshed its

¹² 'Report of the Committee on Staff Organisation', 6/3/19, JH Boraston Papers, IWM. Senior artillery officers were now to be both Commanders and advisers with powers of inspection but emphatically not staff officers. Rights of correspondence were also clarified.

¹³ Birch to Edmonds, 12/3 36, CAB45/122

mobile training. It is more difficult to identify specific artillery support to the engineers, since the sappers were diffused throughout the army. Yet such targets as German gas cylinders or tunnel entrances were shelled. Again, there was relatively little the artillery could do to help the RFC/RAF, to repay the assistance rendered by flying units. Essentially all that was possible was shelling German anti-aircraft guns. This was done as soon as the requisite technology - a compact wireless set - was developed. In the summer of 1915, just as the Germans were improving their anti-aircraft defences, the RA started specifically targeting them.¹⁴ The very first RFC communique related the collaboration of artillery and aeroplanes in deliberately attacking German A-A guns.¹⁵ It would not be long before British aircraft would fly over German lines to provoke A-A fire, which would then be shelled, or force balloons down so they could then be shelled.¹⁶

Artillery support to tanks was more direct and obvious. From the first, tank enthusiasts realised their need for artillery support, which was unstintingly given.¹⁷ The first notes on employment of tanks - published before their debut - stressed the importance of British CB fire, because of tanks' vulnerability to German guns.¹⁸ In the battle of Flers-Courcelette this was provided, as well as elaborate schemes to provide lanes through the creeping barrage so no tank would be knocked out by British shellfire, another concern of the tactical handbooks.¹⁹ As time passed and tanks improved, so did German anti-tank (AT) defences, and the Tank Corps constantly asked for more artillery support. This was given: not just pre-planned CB fire, but special artillery-aeroplane teams to detect and neutralise AT guns.²⁰ Smoke shell also played an important part in hiding tanks from German fire, and it was used as much as supplies (and weather) permitted, but even it was not a panacea, for tanks could lose direction inside a

¹⁴ HA Jones, The War in the Air: Being the Story of The part played in the Great War by the Royal Air Force, VII, (Oxford: Clarendon Press, 1928), p169; No2 HARG (WO95/87), BM57, 5/8/15.

¹⁵ C Cole, ed., Royal Flying Corps Communiques 1915-1916, (London: Tom Donovan, 1990), p18. It was on 26/7/15.

¹⁶ Ibid., VI Corps order, 21 8/15.

¹⁷ 'Notes on the Employment of "Tanks"', ED Swinton, 2/16 in Fourth Army Operations Papers, v5, L6, which foresaw CB fire, bombing aeroplanes and gas supporting the tanks now claimed to be war-winners.

¹⁸ 'Preliminary Notes on Tactical Employment of Tanks (Provisional)', GHQ, 8/16 in Fourth Army Operations Papers, v5 L80.

¹⁹ XIV Corps BGRA diary (WO95/915), 12&13 9/16.

²⁰ III Corps BGRA diary (WO95 693), Artillery Instruction No8, 17 11 17; IV Corps BGRA diary (WO95/729), Artillery Instructions 76, 80 (13, 18/11 1917); VI Corps BGRA diary (WO95/783), 16/6/18.

smoke cloud.²¹ Planning could not remove all the 'friction', especially if it was faulty. Perhaps the most noted AT action of the First World War was on Flesquières Ridge during the battle of Cambrai, as tanks cresting the ridge were destroyed by unsuppressed German guns on the reverse slope.²² Yet there had been a smoke barrage on the ridge during earlier phases of the battle, to block German observation posts. Planners intended the smokescreen to disperse before the assault on Flesquières Ridge, for reasons that have not themselves survived. Had a continued smokescreen been requested by the tanks (or infantry) there is no reason to doubt it would have been provided by the gunners. Alternatively, had the German guns been recognised as a serious AT problem, they would have been shelled. They were not, but the fault does not lie solely with the artillery. By 1918 the BEF used tanks freely, but correspondingly used more and more assets to support them, including detailing the newest and most powerful aircraft to spot AT guns, bomb and strafe them and then call in artillery batteries onto single AT guns.²³ As the war drew to a close the Tank Corps were asking the gunners to deal with 'all anti-tank devices' which sheds doubt on the tank as a war-winning weapon.²⁴

Technology and tactics stood in imbalance in 1914. Over the course of the next four years there were dramatic and inter-related changes in both. Aside from the new forms of warfare - gas, submarines *et al* - nothing was more transformed than artillery. Superficial authors have canvassed the quantities of guns and shells, and more thoughtful ones considered the changes to artillery and called the First World War an artillery war. But to British artillerymen it was not just an 'artillery war'. To them, artillery played a supporting part in a larger production.

²¹ V Corps BGRA diary (WO95/756), 1 11 18 for extra smoke being used on account of tanks.

²² see OH1917v3, especially maps showing smoke barrages.

²³ IV Corps BGRA diary (WO95 730), 19 8/18.

²⁴ WO158/855 'Co-operation of Tanks with other Arms', nd but very late 1918.

APPENDICES

CGS

1. From interviews with various artillery commanders and from the notes left behind by my predecessor on the action of our artillery during the German attack on the VIMY RIDGE, I am led to believe that the fighting efficiency of the artillery could be very much improved if the General Staff issued instructions which would more clearly define the duties of the various grades of higher command in the artillery.
2. I have no doubt in my own mind that in many cases senior artillery officers neither exercise command nor regulate the work of the artillery as they should nor are they allowed in some cases to take up the necessary position in order to perform their duties efficiently. The longer this War continues, the greater the supervision and guidance required from the higher ranks.
3. I am strongly of the opinion that the B.G.R.A. of the Corps and the M.G.R.A. of the Army should be in the same position with regard to their respective commanders of formations as the B.G.R.A. of the division is with regard to his general. The ever increasing amount of heavy artillery in the firing line has altered war conditions. The G.O.C. of the Army and the G.O.C. of the Corps must of course command their own artillery, but they must have the instrument and necessary machinery to do so.
4. In O.B./446 dated 23rd. October 1915, the status of Artillery Adviser with the headquarters of a Corps was altered; he was appointed G.O.C. the artillery of the Corps, and given the executive command of such portion of the artillery in the Corps that the Corps Commander might from time to time direct.
5. There were then three Armies in existence, and each Army interpreted the letter quoted in the preceding paragraph differently. In the First Army the G.O.C., R.A. of Corps formed his heavy artillery into groups and took executive control of group commanders. In the Second Army the heavy howitzers were given to Corps, but the 60-pdrs. were retained for counter-battery work under the Army. In the Third Army the 60-pdrs. were given to Corps to carry out counter-battery work, but the heavy howitzers remained under Army direction, that is to say, that in the First Army the combination of weapons necessary for efficient counter-battery work were in the hands of Corps, whilst in the other two the weapons were divided between the Army and the Corps.

In O.B./446 dated 29th. March 1916, the status of the G.O.C., R.A. of the Corps was again altered. He became "Brigadier-General R.A. of the Corps", was robbed of all executive

command, and given a position analagous to that of the M.G.R.A. in the Army. In O.B./446 dated 7th May, 1916, his duties were again defined, but not, I consider, satisfactorily. The Commander of the Corps Heavy Artillery should have been placed directly under his command.

6. I recommend that the B.G.R.A. of the Corps should again be styled the G.O.C., R.A. of the Corps; that he should be absolutely responsible to his Corps Commander for the efficiency of the whole of the Artillery in the Corps; that he should co-ordinate the action of the Artillery both in offensive and defensive action - the necessary instructions being issued direct to the Commander of the Heavy Artillery, but through the General Staff of the Corps in the case of the Divisional Artillery; and that he should take executive command of any concentration of Corps and Divisional Artillery at the direction of the Corps Commander.

From experience gained as a G.O.C., R.A. of a Corps, I know that all this can be done with an entire absence of friction, and without taking away from the Divisional General the responsibility for the defence of any portion of the line.

7. I further recommend that the M.G.R.A., or Artillery Adviser, of the Army be made the G.O.C. of the Artillery of the Army; that he be made responsible to the Army Commander for the efficient conduct of the Artillery of the Army, and that he be given the power to take executive command of any concentration of Artillery that the Army Commander may see fit to make. It should be his duty when his Army Commander directs to carefully examine all offensive and defensive artillery plans made by Corps and, if the whole Army takes the offensive, to draw up the artillery plan. Unless actually in executive command, his instructions should be issued by the General Staff.

A.A.,

G.H.Q.

8th June, 1916.

(sd) Noel Birch,

Major General

C.G.S.

At your request I send in the following note I consider that at present there are too many people mixed up with the gun and ammunition question (both fighting and supply) at G.H.Q., and that it would be better to inaugurate a system which would place the whole business under one man, who would deal directly with you and the General Staff. At present the following people deal with guns and ammunition:-

With due respect, I believe you have written private letters on the subject.

The Deputy Chief of the Staff writes a great many official letters.

O.A. and O.B. both take a hand in the business.

The Quartermaster General telegraphs home when certain technical questions, which also affect the supply at the front.

The Artillery Adviser tries to help everybody with his advice, if they have time to ask for it and desire it: any decision that he may give on the points raised is not, of course, in any way authoritative.

What the General Staff at G.H.Q. want is a machinery which will make the most of the fighting power of their guns and ammunition in the simplest way and without a hitch. With this ever increasing supply of artillery have they got it and, if not, would they have it if they made the Artillery Office at G.H.Q. a fighting branch of their Staff?

It is interesting to trace the growth of relations between the Artillery and the General Staff during the last two years throughout the Expeditionary Force in France. Great opposition was first raised to giving the Corps Commander an efficient instrument to deal with the whole of his Artillery. The same opposition was raised as far as the Army was concerned. What has happened since? The Army Artillery Adviser, though it is distinctly laid down that he is neither a Staff Officer nor a Commander, has become a fighting officer, and has had to assume a position that he was never intended for by the General Staff and is not entitled to. He allots his guns, controls his ammunition, supervises the artillery fights, counter battery areas, &c. Some Corps Artillery Commanders had already assumed these duties. I do not say that this innovation has been brought about without difficulties and misunderstandings, because to a great extent it has come into being through the personality of individuals (Army Commanders, Corps Commanders, Artillery Commanders) and not from G.H.Q. direction. When in any formation - Army or Corps - the lead has not been given from above, the Artillery results have been bad.

Do you intend to recognise the state of affairs that now obtain in the Fourth and Reserve Armies, and I believe in the Third Army, which has come about as a fighting necessity? If you do, I think you should issue instructions on the subject to bring other Armies

and Corps into line, and also reconsider the machinery of the General Staff at G.H.Q. In my opinion no General Staff, except a Divisional one, is now officially constituted to fight a battle under the conditions obtaining, and the Army and Corps Staff would be very much strengthened by the addition of a recognised artillery machine. In fact the whole situation of the relations between the General Staff and the Artillery, from G.H.Q. to the Corps, wants reviewing in the light of recent experience and future necessity.

It is high time that the "bogey" dual control was knocked on the head. The Artillery Command throughout requires strengthening to prevent dual control in action, and to ensure rapid and efficient concentration of fire, efficient co-operation with aeroplanes, etc.

Witness the organization of the Flying Corps built up on the experience of this War. Nobody can say that there is friction because Brigades are under the G.O.C. Flying Corps as well as under the Armies; and it is worth noting that the Brigade Commander cannot do his work with the Artillery Commander cannot do his work with the Artillery efficiently unless the Army Artillery Adviser is a commander.

A.A.

(sd) Noel Birch

Adv. G.H.Q.

29th. July, 1916.

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